

Air Power Review

Volume 14 Number 2 Summer 2011

Combat ISTAR

Air Commodore Stuart Evans

Bombers, 'Butchers,' and Britain's Bête Noire: Reappraising RAF Bomber Command's Role in World War II

Dr Robert Ehlers

Balanced Air Power in an Age of Austerity – The Leadership Challenge

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Missile-Defence Dilemmas

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The End of Air Power History and the Last Airman?: Air Power, Liberal Democracy and the British Way of War

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Book Reviews

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Air Commodore Neville Parton

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Royal Air Force Air Power Review

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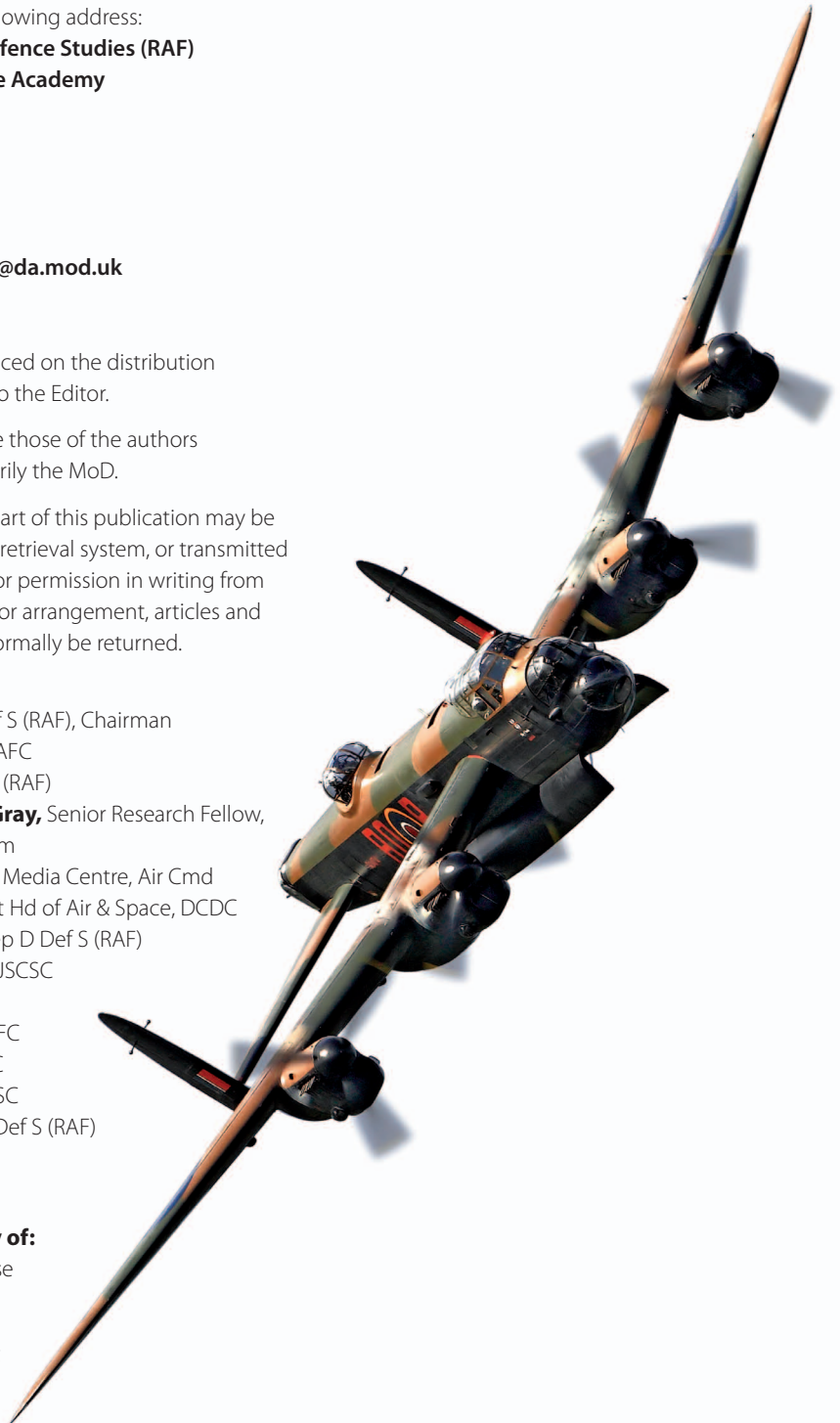
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Volume 14 Number 2 Summer 2011



Arthur T Harris AC AFC

Air Chief Marshal Arthur T Harris

Commanding-in-Chief

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Foreword

This second edition of APR for 2011 begins with an article written by Air Commodore Stuart Evans, latterly head of Doctrine, Air and Space at the Development, Concepts and Doctrine Centre (DCDC) and now Commandant of the Air Warfare Centre. The article is a straight forward and useful clarification of what is meant by Combat Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR). It explains that it is a new philosophy that describes the integrated employment of air, space and cyber systems to deliver assured Intelligence and Situational Awareness (ISA) in contested environments and may be complemented by the coincident delivery of kinetic and influence effects. It further states that ISTAR is a capability that is the product of an amalgam of multi-role, survivable and responsive systems and, by definition, breaks the convention of associating airpower roles with specific platform types.

The second article is submitted by Dr Robert Ehlers, the Director of the Centre for Security Studies (CSS) at Angelo State University (ASU) in San Angelo, Texas. Entitled Bombers, 'Butchers', and Britain's Bête Noire: Reappraising RAF Bomber Command's Role in World War II, the article suggests that no aspect of World War II has been more hotly debated, or so misunderstood, as RAF Bomber Command's offensive against the Third Reich. Until the 1990s, the nearly universal view was that the campaign had been a costly failure, consuming resources that would have been better used elsewhere. The article contends that this still-prevalent view maintains that Bomber Command's raids had no significant impact on Germany's war effort. Critics condemn Bomber Command and its commander, Air Chief Marshal Sir Arthur Harris, for unleashing a brutal and immoral campaign designed to kill civilians, undermine morale, and force the Nazi regime to sue for peace. Consequently, most people now view Bomber Command's offensive as a "cause lost" rather than a "cause won." This article attempts to take an objective approach using recent scholarly and archival work, particularly in the areas of German economic activity and Allied intelligence sources, to argue that Bomber Command in fact caused crippling damage to the German war economy and larger war effort.

The third article, by Air Commodore Dr Peter Gray, entitled 'Balanced Air Power in an Age of Austerity – The Leadership Challenge' examines some of the challenges in funding air power in times of financial stringency. It is a timely piece as it mirrors the theme of the recent Chief of Air Staff's conference at RUSI – entitled Air and Space power in an age of uncertainty. A version of this paper was presented to the Chief of the RAAF's Conference this year and a shortened version to the RAeS Annual Conference. The article points out that air power must be balanced along with the wider interests of defence and not just in terms of a balanced air force. Furthermore the balancing act needs to be seen in terms of capabilities not just the traditional issues around legacy platforms.

Another regular contributor, Group Captain Clive Blount, provides the next article entitled 'War at a distance'. Group Captain Blount is just finishing a tour at the DCDC and will shortly embark on an operational tour. Based on research conducted at the DCDC in the process

of producing Joint Doctrine Note 2/11 'The UK Approach to Unmanned Air Systems', this article looks at potential moral and ethical questions that may be faced in future warfare. As technology provides more ways of engaging lethal force from afar, the decision-making process will present future military and political leaders with new dilemmas as to how such systems may be used within the democratic way of war. The legal justification of such weapons is continually under review and is subject to much study, however, what is less discussed is the question 'Should we?' rather than 'Can we?' This article aims to identify potential areas for debate by examining the employment of unmanned aircraft in the future, with particular emphasis on growing autonomy.

The fifth article entitled 'Missile Defence Dilemmas' is submitted by Dr David Gates from the RAF Cranwell division of the Department of Defence Studies, King's College, London. The article discusses the *Ballistic Missile Defence Review Report* which resulted from the review of the USA's policy and plans regarding ballistic missile defence, which President Barack Obama ordered shortly after coming to office in 2009. The report has led to substantial changes in approach that have ramifications for the defence of, not only North America, but also the whole NATO region and other countries that have linked their security to that of the USA. Not least because of developments in the Middle and Far East, missile defence is one of the greatest and most pressing challenges within the realm of aerospace power. It is also one that is peculiarly fraught with political, technical and operational complexities.

The final article is provided by Group Captain John Alexander, Chief of Staff of the Force Reintegration Cell in the Headquarters International Security Assistance Force, Kabul. The article, entitled 'The End of Air Power History and the Last Airman?: Air power, liberal democracy and the British way of war' seeks to add to the post-Cold War character of conflict debate by putting air power, its attractiveness to liberal democracies and the subsequent British way of war, in both conventional war and counter-insurgency, into historical context. It begins with a synoptic examination of the utility of air power in what David Edgerton has called liberal militarism, enabling Britain to avoid bloody and expensive land conflict by using economic, technical and industrial superiority. The article then questions the notion that air power has limited utility in counter-insurgency by examining Britain's use of air power as part of a liberal militarist approach to counter-insurgency. The third section critically analyses the argument deployed before the recent Strategic Defence and Security Review (SDSR) that unitary, land-centric conflict would predominate and therefore Britain's armed forces needed rebalancing. The article concludes by contending that intervention in Libya is an example of liberal militarism and continuation of the British way of war. The article's conclusion is that air power remains fundamental to the British way of war in post-Cold War conflict, as it has since the First World War.

This edition concludes with a book reviews by Group Captain Clive Blount (The Age of Airpower), Group Captain John Alexander (Lawrence's Secret Air Force), Group Captain Ian Shields (JDN 2-11) and Air Commodore Dolly Parton (Art of Action).

Finally, lest we forget the value of air power for operations other than COIN, as we go to print, Group Captain Mike Hart, Director of Defence Studies (RAF), is deployed in support of air operations over Libya. He was deployed at relatively short notice, but was nevertheless able to draw on expertise not routinely available within the MoD by drawing on the academic contacts he had made during his year as a CAS Fellow at Cambridge in order to better prepare himself and deepen his knowledge and awareness of the political complexities of Libya and the region as a whole. This is a tangible and demonstrable operational benefit of the kind of academic engagement fostered by the CAS Fellowship scheme.

RAF CAPS Prizes and Awards 2010



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The Gordon Shephard Memorial Prize

The Gordon Shephard Memorial Prize is awarded in memory of Brigadier G F Shephard DSO MC RAF. The competition provides a unique opportunity for personnel to air their thoughts and ideas, directly relevant to the Royal Air Force or to the employment of air power more generally, in a Service paper or essay, with the chance of winning a cash prize of £200.

The winner of the 2010 Gordon Shephard Memorial Prize is Gp Capt Al Byford for his essay entitled ‘False Start: The Enduring Air Power Lessons of the RAF’s Campaign in Norway, Apr-Jun 1940’, which was printed in *Air Power Review Vol 13 No 3* (Autumn/Winter 2010).

The 2 Air Forces Award

In 1997, the Royal Air Force Historical Society agreed to a request from its United States equivalent organization, The Air Force Historical Foundation, to fund an annual award called “The Two Air Forces Award”. The award will be given, on each side of the Atlantic, to the serving officer, airman or airwoman who writes the most pertinent article of the year on a Defence related topic. The award is selected by the committee of The Royal Air Force Historical Society.

The winner of the 2010 2 Air Forces Award is Lt Col A M Roe, YORKS, for his essay entitled ‘‘Pink’s War’ – Applying the Principles of Air Control to Waziristan, 9 March to 1 May 1925’, which was printed in *Air Power Review Vol 13 No 3* (Autumn/Winter 2010).

The Park Prize

The Park Prize is awarded in memory of Air Chief Marshal Sir Keith Park who was one of the most effective operational Air Commanders of the Second World War. The prize is worth £200 and is awarded annually to the best essay on an air power related theme submitted to RAF CAPS by a serving RAF junior officer, non-commissioned officer, airman or airwoman.

The winner of the 2010 Park Prize is Flt Lt Sandy McKenzie for his submission 'After the Surge: Implications of Strategic Shift in Afghanistan and Beyond' which was printed in *Air Power Review Vol 13 No 3* (Autumn/Winter 2010).

The Salmond Prize

The Salmond Prize is awarded in memory of Air Chief Marshal Sir John Salmond who was appointed Chief of the Air Staff in succession to Trenchard. The £200 prize is awarded annually to the best essay on an air power topic submitted to RAF CAPS by a civilian or non-RAF serviceman or servicewoman of any nationality.

The winner of the 2010 Salmond Prize is Professor Philip Sabin for his submission 'The Current and Future Utility of Air and Space Power' which was printed in *Air Power Review Vol 13 No 3* (Autumn/Winter 2010).

Notes on Contributors

Air Commodore Stuart Evans joined the Royal Air Force in 1983, completing basic pilot training on the Jet Provost at Royal Air Force Linton on Ouse. After advanced fast-jet training on the Hawk, he was posted to the Central Flying School, training for and subsequently serving as a first-tourist qualified flying instructor. Following Tornado conversion training he joined 17(F) Squadron, Royal Air Force Brüggen in 1990 where he flew the Tornado GR1. Becoming a qualified weapons instructor, he flew the Tornado GR1A from both Royal Air Force Honington and Marham. He was selected to attend the Royal Australian Air Force Staff College. Promoted to Wing Commander while on this course, he attained a Master of Defence Studies from the University of Canberra. Following a tour in MOD he took command of IX (Bomber) Squadron, Royal Air Force Marham, in January 2004. During this tour he took his total flying hours to over 4,000 with over 2,700 hours on the Tornado. In 2008 he was selected to fill an exchange appointment within the Chief of Staff of the United States Air Force Strategic Studies Group in the Pentagon. He returned to the United Kingdom in July 2010 on promotion to Air Commodore to take up an appointment at the Development, Concepts and Doctrine Centre. Air Commodore Evans has recently taken over as Commandant of the Air Warfare Centre.

Dr Robert Ehlers is the Director of the Center for Security Studies (CSS) at Angelo State University (ASU) in San Angelo, Texas. He earned his B.A. in international studies from The Ohio State University, an M.A. in history from the University of Florida, and returned to Ohio State to complete his doctorate in history. He was also an Air Command and Staff College distinguished graduate. A retired U.S. Air Force colonel and former professor of airpower history at the School of Advanced Air and Space Studies (SAASS), Ehlers served as an air intelligence officer for nearly 24 years. His assignments included several intelligence tours; three command tours; his SAASS posting, and academic appointments at the U.S. Air Force Academy's History Department. Dr. Ehlers became Director of ASU's CSS in August 2010 and leads a team of 18 faculty and staff in the development of the Center's degree programs and related initiatives.

Air Commodore Dr Peter Gray retired from the Royal Air Force in June 2008 and took up the position of Senior Research Fellow in Air Power Studies at the University of Birmingham on 1st September 2008. Prior to retirement, Gray was Director of the Defence Leadership and Management Centre taking up post in September 2004. Gray spent his early career as a navigator on the F4 Phantom aircraft and, more recently, commanded 101 Squadron flying VC10 K tanker aircraft. He has spent two staff tours in the personnel field followed by a lengthy sojourn in the Cabinet Office, several appointments in the Ministry of Defence and has served as Director of Defence Studies for the Royal Air Force. Gray holds degrees from the Universities of Dundee, London, Cambridge and Birmingham (PhD). He is a Fellow of the RAeS and of the Institute of Leadership and Management.

Group Captain Clive Blount is Assistant of Air and Space at the Development, Concepts and Doctrine Centre at Shrivenham. A fast-jet navigator by trade, he has a varied flying background including tours in as an instructor and in test flying. He has completed staff tours in the MOD, NATO, and with HQ KFOR in Kosovo, commanded RAF Gibraltar, has served as an ACSC tutor and 'until recently' was XO of the Air Warfare Centre Test and Evaluation Division at Boscombe Down. He was a Tedder Fellow in 2007/8, gaining an MPhil International Relations at the University of Cambridge and is currently engaged, as a Portal Fellow, in part-time study for a PhD with King's College London.

Dr David Gates MA, D.Phil (Oxon), PGCAP, FRHS, FHEA is a member of the Cranwell division of the Department of Defence Studies, King's College, London. He formerly taught at the Universities of Lancaster, Cambridge and Aberdeen and has held Visiting Fellowships at the Militärgeschichtliches Forschungsamt and the University of Freiburg in Germany. He is the author of numerous books and articles on various aspects of military history and current defence affairs, including several on aerospace power.

Group Captain John Alexander is Chief of Staff of the Force Reintegration Cell in the Headquarters International Security Assistance Force, Kabul. He commanded 37 Squadron RAF Regiment and the Joint Rapier Training Unit. He has spent a total of four years deployed in the Middle East and two in the Falkland Islands. He has completed staff tours in the MOD, PJHQ and Air Warfare Centre. Until January 2011 he was Assistant Head Futures at the Development, Concepts and Doctrine Centre where his responsibilities included the *Global Strategic Trends* and *the Future Character of Conflict* studies. He was a Tedder Fellow at Cambridge, has three other degrees from the Newcastle University and the Open University and is a part-time doctoral researcher at the University of Birmingham.

Combat ISTAR

By Air Commodore Stuart Evans

“Combat Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR)” is a new philosophy that describes the integrated employment of air, space and cyber systems to deliver assured Intelligence and Situational Awareness (ISA) in contested environments and may be complemented by the coincident delivery of kinetic and influence effects. It is a capability that is the product of an amalgam of multi-role, survivable and responsive systems and, by definition, breaks the convention of associating airpower roles with specific platform types.

Introduction

Background. One of the enduring lessons of current operations is our key dependency on Command, Control, Communications, Computing (C4) ISTAR for the delivery of kinetic and influence effects. Advances in the provision of ISA throughout the Joint Force have been transformational, and this enhanced information flow across the battle-space is now a fundamental part of the way we conduct operations; it provides a significant asymmetric advantage. However, we will not always benefit from a benign air environment or the ground holding advantages we have enjoyed in both Iraq and Afghanistan. These have allowed us to develop fixed in-theatre C4ISTAR architectures and a level of air ISTAR over-watch that we may be unable to replicate in future operations in more contested air, space and surface environments.

Requirement. The Future Air and Space Operational Concept envisages the future Operational Environment as, *“expeditionary, of varying endurance and intensity, and typified by the multiple challenges of littoral-urban complexity, target discrimination, Computer Network Operations (CNO) and integration with Joint, Inter-Agency and multinational capabilities.”*¹ Furthermore, the blurring of conventional and irregular threats lies at the heart of the increasing incidences of ‘hybrid warfare’, fought against low signature adversaries, with access to sophisticated technology, operating in complex terrain, able to adapt quickly and consequently present fleeting targets. To meet these challenges, there will be an ever-greater requirement to deliver assured information superiority across a whole range of contested and uncontested operating environments. This will require multi-intelligence understanding of the physical and human terrain we are operating within, which in turn will demand the effective fusion and networking of joint ISTAR capabilities, including the exploitation of cyberspace.² In airpower terms, the future operational environment points to ever-greater interdependence between airpower roles, particularly: Control of the Air, ISA, and Attack.

Airpower makes a key ISTAR contribution, it is able to maximise its comparative advantage in the third and fourth dimensions to direct, collect, process, disseminate and exploit information in order to enable intelligence-led actions.³ Legacy thinking, however, associates the role of airpower with specific platform types and unhelpfully masks Air’s broader ISTAR contribution. For example, fast jets are associated with the role of attack and control of the air, large aircraft with combat support functions and support helicopters viewed as purely providing tactical manoeuvre. Typecasting specific platforms with individual roles hides their utility and distracts us from the potential that could be unlocked with the application of future technologies.⁴ A new paradigm is required to convey the full utility of platforms and their broader ISTAR contribution.

Definition. Combat ISTAR is a new philosophy that seeks to break legacy thinking that associates the roles of airpower with specific platform types. The term Combat ISTAR conveys the wider ISTAR contribution and potential of various platforms, and the requirement for information superiority in current and future conflict. Combat ISTAR encompasses three

separate, but interdependent, roles of airpower - Control of the Air; Intelligence and Situational Awareness; and Attack - and applies a systems approach to deliver more than the sum of the parts. Combat ISTAR emphasises and exploits the increasing blurring of the edges between these airpower roles, without challenging their primary purpose. Combat ISTAR is defined as **the provision of assured Intelligence and Situational Awareness derived from the synergistic employment of networked air, space and cyber systems in complex and contested operating environments, potentially in tandem with responsive kinetic and influence effects.**

CNO is a vital component of Combat ISTAR. Computer Network Exploitation will provide a key source of ISTAR 'take' across all operating environments, while Computer Network Defence is crucial to the information assurance upon which our ability to gain information superiority rests. In the context of Combat ISTAR, this information assurance has a particular relevance to our dependence on space capabilities to provide the positional, navigation timing and targeting information upon which our joint effects increasingly depend, as well as the likely future need for space-based surveillance as a central component of assured Combat ISTAR.

Combat ISTAR provides insight for the Military, Other Government Departments and Non-Governmental Organisations, helping to synchronise, inform and support multiple lines of operation within the Comprehensive Approach. Although described in airpower terms, Combat ISTAR has wider application across a range of Joint and 'Whole of Government' intelligence and surveillance capabilities. Combat ISTAR is at the heart of ongoing RAF transformation and, as a technologically based service with a tradition of networking, driven by the particular requirement of air operations for timely information, the RAF is well placed to assist with the wider integration and governance of Joint and 'Whole of Government' ISA capabilities.

Conclusion. Combat ISTAR, and the assured understanding it brings, is an essential pre-requisite of success for current and future operations, which increasingly rely on the provision of ISA throughout the Joint Force. This information flow is a fundamental part of the way we conduct operations. However, we will not always benefit from an air and ground environment that permits the utilisation of fixed surface C4ISTAR facilities and relatively vulnerable air ISTAR assets to provide much of this ISA. We must therefore shape the Joint Force to allow the employment of these ISTAR effects in the less permissive, more complex and contested surface and air environments envisaged in FASOC. Air and space power will be central to the attainment of an assured capability. However, we must not be constrained by legacy thinking,

which hinders the flexible use of our platforms and systems. The Royal Air Force will develop a more flexible and agile force structure capable of Combat ISTAR operations across the full range of operating environments. It will maximise the delivery of assured effect, made possible by the manoeuvre advantage enjoyed by air, space and cyber assets.

Notes

¹ DCDC, *"Future Air and Space Operational Concept 2009,"* Aug 2009, P1-5.

² Gaining genuine understanding across the physical, social and cyber environments requires multi-int fusion across GEOINT, IMINT, MASINT, OSINT, SIGINT and HUMINT disciplines.

³ Chief of the Air Staff, *"Dominant Air Power in the Information Age – The Comparative Advantage of Air and Space Power in Future Conflict,"* IISS Address, 15 Feb 2010.

⁴ DCDC, *"Future Air and Space Operational Concept 2009,"* Aug 2009, P2-1.

Bombers, 'Butchers,' and Britain's Bête Noire: Reappraising RAF Bomber Command's Role in World War II

By Dr Robert Ehlers

No aspect of World War II has been more hotly debated, or so misunderstood, as RAF Bomber Command's offensive against the Third Reich. Until the 1990s, the nearly universal view was that the campaign had been a costly failure, consuming resources that would have been better used elsewhere. This still-prevalent view maintains that Bomber Command's raids had no significant impact on Germany's war effort. Critics condemn Bomber Command and its commander, Air Chief Marshal Sir Arthur Harris, for unleashing a brutal and immoral campaign designed to kill civilians, undermine morale, and force the Nazi regime to sue for peace. In this dominant narrative, brave airmen were sent to do a job that was operationally ineffective and morally reprehensible. Consequently, most people now view Bomber Command's offensive as a "cause lost" rather than a "cause won." This paper attempts to take an objective approach using recent scholarly and archival work, particularly in the areas of German economic activity and Allied intelligence sources, to argue that Bomber Command in fact caused crippling damage to the German war economy and larger war effort.

Introduction

No aspect of the Second World War has been more hotly debated, or so badly misunderstood, as RAF Bomber Command's heavy-bomber offensive against the Third Reich. Until the early 1990s, the nearly universal view was that the campaign had been a costly failure, consuming huge quantities of resources that would have been better used elsewhere. This view, still prevalent in many quarters today, maintains that Bomber Command's raids had no significant impact on the German war effort. Critics have condemned Bomber Command and its commander, Air Chief Marshal Sir Arthur Harris, for engaging in a brutal and utterly immoral campaign designed to kill civilians, undermine morale, and force the Nazi regime to sue for peace. In this dominant narrative, brave airmen were sent to do a job that, while highlighting their courage, was operationally ineffective and morally reprehensible. In this sense, most people now view Bomber Command's offensive as a "cause lost" rather than a "cause won." A very recent work, Randall Hansen's *Fire and Fury* (2009), demonstrates that this thesis is alive and well.

This presentation attempts to take an objective approach using recent scholarly and archival work, particularly in the areas of German economic activity and Allied intelligence sources, to argue that Bomber Command in fact caused crippling damage to the German war economy and the Reich's larger war effort. While this is not a discussion about moral issues, but rather about strategic and operational effects and effectiveness, I will raise the moral issue to demonstrate the extent to which it has detracted from a careful look at what RAF Bomber Command actually achieved at the strategic and operational levels. As we will see, the moral argument not only overshadowed any serious discussion of military effectiveness, but in fact strangled it in its infancy. The moral dimension also requires some attention because we need to understand how viewing Bomber Command's actions through late twentieth century and early twenty-first century analytical and moral lenses has distorted our collective understanding of the ways in which people fighting for their national survival, and in the latter stages of the war just wanting to end it as quickly as possible at the lowest cost in blood and treasure, arrived at the decision to bomb the Third Reich's cities, and to keep bombing them. Only by taking account of all the contemporary factors and a large collection of new primary-source material can we begin to understand fully that Bomber Command's "cause lost" was in fact, to a much greater degree than hitherto appreciated, a "cause won".

Moral and Operational Arguments: Obscuring the Reality of Military Effectiveness

While the vast majority of both the British and American people supported RAF Bomber Command's efforts during the course of the war, an increasing moral concern began setting in after Dresden met its fiery demise on 13 February 1945. Within weeks after the raids that destroyed the city, Winston Churchill himself told Air Chief Marshal Arthur "Bomber" Harris, Commanding-in-Chief, RAF Bomber Command, that the time had arrived to begin using a greater degree of discernment in attacking German cities, and that heavy bombers must turn

towards direct-support missions to speed the advance of Allied soldiers into the Reich.¹ Churchill further forbade anything but a modest bombing survey, rather than the detailed assessment recommended by the Air Ministry's leadership and its subordinate British Bombing Survey Unit. The cursory study that followed, which is miniscule when compared to the Army Air Forces' *United States Strategic Bombing Survey*, was for the most part a statistical analysis with far too little discussion of the effects and effectiveness of Bomber Command missions against the Reich. When every major British command with the notable exception of Harris received a campaign ribbon, it was clear that the politicians, at least, had turned against Bomber Command's commander, his methods, and the command itself.

Consequently, with the notable exception of Harris' own memoir, *Bomber Offensive*, which most readers already viewed as "tainted" given its author and his unapologetic stance on the importance and value of city bombing, almost nothing laudatory or even marginally objective appeared in the immediate postwar years about Bomber Command's role in the war. A few books such as J. M. Spaight's *Bombing Vindicated*, which appeared in 1955, fought a losing rearguard action with far too few useful sources, but they could not overcome the combination of growing disdain for, and disinterest in, Bomber Command's wartime efforts. In fact, almost nothing at all of real note went to press on this subject after 1955 with the key exception of the Charles Webster's and Noble Frankland's official history, and even that did not appear until the early 1960s. Although the official historians made the case that heavy bombers had done vital work against oil, transportation, and other targets, even they appeared reticent to say Bomber command's efforts had any kind of major role in victory. Finally, even the BBSU's brief survey went unpublished until the 1990s. Although several books published long after the war did take a collective first step towards recognizing Bomber Command's important strategic and operational contributions to victory—and these include John Terraine's *The Right of the Line*, Denis Richards' *RAF Bomber Command in the Second World War: The Hardest Victory*, and A. C. Goulding's *Uncommon Valour*, among others—many others have held doggedly to the first paradigm that emerged after World War II—namely, that Bomber Command aircrew performance, while courageous, had not exerted any significant effect on the course of the war. Max Hastings' *Bomber Command* and, much more recently, Randall Hansen's *Fire and Fury*, are in this genre. Hansen goes so far as to argue that the USAAF could have performed all of Bomber Command's tasks more effectively, which is patently false, especially when we look at the unique operational capabilities British heavies brought to the transportation and oil offensives.²

In contrast to this very tardy and partial analysis of Bomber Command effects and effectiveness, a voluminous literature regarding its moral failings sprang up relatively quickly and has dominated the scholarly conversation ever since. In fact, it effectively overshadowed any serious look at what Bomber Command accomplished, and it has continued to do so right up to the present. F. J. P. Veale led this off with *Towards Barbarism*, published in 1949, followed by R. Grenfell's *Unconditional Hatred?* in 1954. Early German works, often produced by a team of authors who wrote about a specific city's experiences during the bombing, acted as catalysts that propelled this issue into the limelight. More recently, A.C. Grayling's *Among the*

Dead Cities illustrates both the importance of grappling with the moral issue and the dangers of doing so to the exclusion of facts regarding British bombing effectiveness. Full of serious historical inaccuracies regarding the nature and effectiveness of British bombing, and starting from the position that it was both immoral and ineffective (in fact, there is a clear case of ipso facto reasoning here—in other words, that one in effect followed from the other—as there is in nearly all such books), Grayling's work represents the norm in this genre.³ So, too, does Nicholson Baker's *Human Smoke: The Beginnings of World War II, The End of Civilization*. The effects of this focus on moral issues resulted in a long delay from war's end to a serious and broad scholarly engagement with RAF Bomber Command's effectiveness, and in the persistent idea that city bombing was a moral crime not worth the human and material costs even were one to assume it was highly effective. To address the issue of strategic and operational effectiveness, we must therefore decouple the moral and military dimensions, at least for the purposes of establishing Bomber Command's substantive contributions to Allied victory.

Bomber Command City Raids, 1943: Reassessing Their Impacts

Despite Bomber Command's inability to defeat Germany on its own (and by 1944 only Arthur Harris still believed it either could or should), its efforts did pay major dividends, especially when viewed in conjunction with USAAF raids. Intelligence officers were able to point to several specifics, and they had at least a strong gut feeling about others. However, the full effects of Bomber Command's efforts have become clear only in the light of very recent scholarship, conducted primarily in the German archives by Richard Overy and Adam Tooze.⁴ Nonetheless, others were driving at answers even earlier.

In a 1987 interview, Lt Col Lewis Powell, Spaatz's Ultra representative, said, "Whether one approves of area bombing which the RAF did or not, it was effective in terms of disrupting communications, and commitment of German personnel."⁵ Powell was clearly referring to both the First and Second Battles of the Ruhr in 1943 and 1944-45, and to the transportation and oil offensives in 1944-45.

The first clear sign of bombing effectiveness was the large degree of disruption, dislocation, and dispersal of factories and people it imposed on the Reich. When considering these effects it is important to keep in mind one of the key arguments made at the beginning of my recent work on air intelligence and its relationship to the heavy bomber campaigns: that Allied bombing was the creator of friction in the German war economy *par excellence*. This was certainly true of city attacks. As Richard Overy has noted, "Bombing also had the effect of interrupting in arbitrary and unpredictable ways the web of supplies of materials and parts on which the whole industrial structure depended. The gradual collapse of the supply system forced firms to carry larger stocks again, and left regular gaps in the supply of components or scarce materials."⁶ The Battle of the Ruhr marked the first point at which these problems became pronounced. Ultra intercepts, which became more frequent in the summer of 1943, record this growing shortage of components, including spare parts for artillery as well as

Me 109 and FW 190 propellers. The salvaging of crashed fighter aircraft also took priority over all other salvage efforts, indicating how desperate the Germans were for spare parts for these planes.⁷

Thus, while city attacks were clearly not decisive, they did create serious difficulties for the Germans, whether in halting production in factories for varying periods of time or forcing the dispersal of war industries. This process took time and required the services of huge numbers of both skilled and unskilled workers, of which the former were in very short supply as more and more skilled (and older) male workers traded in their overalls and tools for uniforms and rifles and headed to the front. Although this increasing shortage of skilled workers was an ancillary problem, its interaction with the direct and indirect effects of bombing was significant. The adverse effects of dispersion became even more acute once bombers began attacking the German transportation network in late 1944, disrupting the flow of components to central assembly points and causing huge quality-control problems throughout German industry. Horst Boog made this clear when he pointed out that the dispersal of aircraft production resulted in the establishment of around 700 small shops, whereas previously the entire industry resided in 30 large factories. On the human side of this disruption, Boog said, "The number of man hours lost through night alerts and absenteeism are incalculable."⁸

Equally important, recent scholarship has demonstrated conclusively that the German war economy was already tightly stretched by 1943 and that certain vital materials, including steel and sub-components for a huge array of heavy weapons and aircraft, were in very short supply. Add to this a severe coal shortage in 1942, and the conditions for serious injury were present.⁹ Three other factors exacerbated this problem, creating a major crisis in German armaments production. The first was Bomber Command's effort against the Ruhr, which housed most of the steel and industrial sub-components factories. These targets suffered severe damage, as did the transportation hubs responsible for moving goods to arms factories and assembly points. So, too, did the natural gas and electrical pipes and conduits throughout the Ruhr, which took a terrible beating at the hands of the new 4,000 lb. "Blockbuster" bombs in combination with incendiaries. The second was the start of intensive USAAF daylight bombing, which caused major damage to several different industries (especially aircraft factories and ball bearing plants), exacerbated the already-serious stoppages and dislocation in the war economy, and forced yet another acceleration of dispersal. The third factor was the high combat tempo throughout 1942-43, which left the *Wehrmacht* in desperate need of replacement heavy weapons, vehicles, and other equipment. By bringing Speer's nascent "Armaments Miracle" to a screeching halt during the second half of 1943, bombing created serious equipment shortages at the front. It also inhibited the Germans from developing new generations of weapons, as they instead struggled to keep current models coming off the production lines. Steel output, the key indicator for heavy-weapons production other than aircraft, suffered a 400,000-ton shortfall as a result of Bomber Command raids.¹⁰

In his superb book on the German war economy, Adam Tooze concluded that, "Reading

contemporary sources, there can be no doubt that the Battle of the Ruhr marked a turning point in the history of the German war economy...[it] has been grossly underestimated by post-war accounts...Bomber Command had stopped Speer's armaments miracle in its tracks."¹¹ As he also noted, the real tragedy of the Battle of the Ruhr was Harris' failure to keep attacking key targets in the region, turning his efforts instead to the political-economic-military chimera of Berlin and ushering in a battle that nearly destroyed Bomber Command. Given the German steel and sub-components crises, persistent attacks against the Ruhr would have paid greater dividends.¹² As Hitler himself said, "The Ruhr is the one base for our industry which cannot be evacuated."¹³

Even though Harris ended it early, the "Battle of the Ruhr" was disastrous for Germany. Although aggregate production eventually increased, it did not do so until 1944, and even then large numbers of now-outclassed weapons such as the Bf 109 and Mk IV medium tank continued to roll off assembly lines, often unserviceable as they awaited components missing due to transportation and production problems. Newer weapons, such as the Panther and Tiger tanks, the Ta 152 and the Me 262, appeared in smaller numbers and significantly later than would otherwise have been the case.¹⁴ Albert Speer addressed this issue somberly in a speech to the Reich's Gauleiters on 6 October 1943:

*We have lived through times in army equipment when our tanks were inferior to those of the Russians...The Luftwaffe in the course of the last two years has quite indubitably suffered from an absolute inferiority, a technical inferiority to the weapons of the enemy. And you can see from this example [production of inferior weapons and their poor effectiveness on the battlefield] what it means to be able to procure the quantity and [yet] to be qualitatively inferior. This is quite unsupportable in our situation.*¹⁵

In other words, even if the Germans could build enough weapons, they would be of little use of if they were technologically inferior to those of the Allies and the Soviet Union.

As Speer noted, problems with aircraft proved particularly daunting because German pilot training was already far inferior to that of the Allies, and the cream of the German fighter force was about to face annihilation in the skies over the Reich. Finally, even as production peaked in July 1944, the oil campaign was getting into high gear, robbing the German army of mobility. It also created a cataclysmic aviation fuel shortage for the many new but already outdated aircraft—and their hopelessly outclassed young pilots—as they made their way to "the front" (which, in their case, was directly overhead). As an American intelligence officer with access to Ultra noted,

[T]he Germans did manage ultimately to restore a very high scale of fighter production. But the setbacks of the summer were so effective as to postpone fighter expansion and cripple their fighter training through the critical period until American fighters themselves won unquestioned air supremacy over every corner of Germany. The very loss of production

entailed by the dispersal process itself helped to contribute to the single-engine fighter shortage of which the ensuing months were to provide incontrovertible evidence.¹⁶

When viewed in this light, the opportunity costs to German front-line strength were startlingly high. The production cap imposed in the latter half of 1943 resulted in the production of 35 percent fewer tanks, 31 percent fewer aircraft, and 42 percent fewer trucks than would otherwise have rolled off the assembly lines, at a time when having them really mattered given Germany's still-viable if unenviable operational, fuel, and manpower positions. Without the cap imposed first by Bomber Command raids against the Ruhr, and later supplemented by USAAF daylight raids, 30,000 additional tanks and 55,000 additional aircraft could have rolled off the production lines.¹⁷

The diversion of productive capacity, weapons, and manpower to defend the Reich against heavy bombers also proved very costly. By November 1942, Ultra intercepts confirmed that German aircraft were already leaving the Eastern Front for France to counter bomber operations against U-boat bases. Although these raids proved ineffective, Luftwaffe assets sent to counter them never returned to Russia—they simply folded into the mushrooming Reich air-defense effort. Ultra also confirmed details of the vital conference in January 1943 during which Adolf Galland presided over planning for the activation of the huge fighter arm that would comprise *Luftflotte Reich* once that command stood up officially in January 1944. These intercepts confirmed the growing flood of requirements for aircraft to return to the Reich to protect its cities. In summer 1942, the Luftwaffe had concentrated 60 percent of its air strength in the East. By July 1943, only 36 percent remained facing the Russians, and an even more pathetic 21 percent of the fighter force. By January 1944, only 17 percent of the fighter force was still in the East. Hundreds of fighters, including a large number of Me 110 twin-engine aircraft and some Ju 88s purpose-built with air-intercept radar for night operations, comprised this exodus, indicating that the Germans were every bit as concerned about Bomber Command attacks as they were about USAAF daylight attacks. Equally serious, in early June 1943 Göring ordered a massive dispersal of all aircraft production and Luftwaffe operational assets. By October 1943, combat units had begun cannibalizing aircraft for spare parts as the sub-components crisis and other effects of Bomber Command's Ruhr Campaign took their toll.¹⁸

The huge diversion of anti-aircraft artillery (AAA) is well known in general terms, but many key details are not. Production of AAA accounted for 14 percent of total war production in the first quarter of 1940 but 29 percent by the first quarter of 1943—all *before* the USAAF had made any serious contributions to the fight. During this same period, the number of heavy AAA pieces in Greater Germany increased from 1,700 to 4,500—some 55 percent of all *Wehrmacht* AAA assets. When one adds medium and light AAA—also of great use at the front—the number was 15,000, with 11,000 of those in the Reich itself, an incredible 73 percent of all AAA assets. Had the Germans been free to allocate AAA as they saw fit, and without the production limitations brought on by steel shortages, they could have deployed another 13,500 guns to the front. Merely the aluminum used up in the production of AAA fuses would have been enough to

allow for production of an additional 40,000 fighter aircraft, although their utility would have been severely limited due to current and future pilot and fuel shortages. The same cannot be said of heavy AAA pieces—all potent tank-killers—and the one million men who manned them in Germany rather than on the Eastern Front. Hitler and Göring were clearly alarmed by the Ruhr raids and began a huge effort to move both AAA and fighters to the Reich for air-defense purposes. On 31 May 1943, the Führer simply said, “It is necessary to increase the flak and night fighter forces in order to protect German cities.”¹⁹

Although many of the AAA crews were too old or young for combat duty, and they actually downed more aircraft than German fighter pilots, the facts of this huge diversion of material and human resources remain unchanged. In addition, the German requirement to choose between producing AAA pieces and ammunition as opposed to conventional artillery and munitions helped create major gun and ammunition shortages on every front by 1944. Taken together with all the other damage caused by Bomber Command, one cannot help but be struck by the force of Sebastian Cox’s simple observation about the massive diversion of German personnel and weapons to air-defense duties: “This rather begs the question as to why, if the effects on the Reich economy were not significant, the Germans felt it necessary to divert military forces badly needed at the front to protecting the Reich?”²⁰

Recent scholarship has also reassessed an issue long thought put to rest: morale and nutrition among German workers. While German morale never broke, the relentless bombing clearly reduced it, while the gradually-tightening civilian rations caused higher levels of sickness and absenteeism. Even workers at their posts were less productive as the slow effects of nutritional inadequacies set in. At the Ford plant in Cologne, for instance, 25 percent of the workforce was absent from work each day.²¹ Particularly in the Ruhr, where air-raid sirens went off constantly in spring and summer 1943, and indeed throughout much of 1944 and early 1945, simple exhaustion would have been an important factor in gauging productivity. As already noted, there were too few skilled German workers to begin with; and the increasing drafts of older, skilled male workers for the military led to the importation of foreign and servile workers. How well they performed their tasks is difficult to measure with precision, but there can be little doubt that they were less capable or, just as important, less dedicated than the German men they replaced. As Horst Boog has noted:

*The number of man-hours lost by frequent air alerts is impossible to measure, but since machine tools suffered relatively little from bomb damage, the human factor must be rated very high in accounting for the decrease in fighter—and other—production in later 1943... People continued to do their duty in a fatalistic and apathetic mood, and this did not increase their devotion to the political cause and to productivity.*²²

The official historians of Bomber Command operations agreed with this analysis, perhaps somewhat unwittingly. They noted that productivity at industries in Solingen suffered heavily and for several months in 1943 because, even though the city was not attacked directly,

many of the workers in its plants resided in Wuppertal and Remscheid, both of which were devastated by Bomber Command raids. This is only one instance of several in which they mention this phenomenon (absenteeism as a result of refugee movements and the death or injury of workers), but Boog makes clear that it was widespread and costly.²³

Bomber Command aerial mining missions in the Baltic also led to major German shipping losses (and the vital high-grade Swedish iron ore they carried) and delayed sea trials of new U-boats such as the Mark XXI. These new boats could not have turned the tide, but they would have caused much greater shipping losses. Instead of getting 20 or more Type XXIs operational by 1945, the Germans managed only one. Ultra confirmed these delays. Harris pushed hard for these mine-laying missions while Deputy Director of Plans at the Air Staff in 1939. His efforts paid off. By April, 1940, Hampden bombers were deploying magnetic mines—an operation that grew dramatically in scale, sophistication, and effectiveness when Harris took charge at Bomber Command. By VE Day, Bomber Command had deployed 47,000 aerial mines and engaged in other raids that sank 717 merchant vessels and damaged another 665. This effort extended to the Danube River, where Bomber Command 205 Group's efforts virtually shut down Rumanian oil and agricultural deliveries to the Reich in summer 1944. Together with the USAAF, Bomber Command also destroyed 111 U-boats in production and another 54 already delivered to the *Kriegsmarine*. Additionally, 423 merchant vessels were sunk between 1 January 1940 and 30 June 1943, placing the German steel position, already precarious, in a severe predicament. Mining and ship attacks were elements in an aggregation of factors that brought about the "steel famine" of 1943, which put a stop to Speer's armaments expansion until early 1944.²⁴

Finally, although wartime damage assessments did not reveal it, British bombing prompted Hitler to support several outrageously irrational, expensive, and ineffective programs, including the V-2, which caused a huge diversion of scarce resources. Michael Neufeld has estimated that, given the relative sizes of the German and American wartime economies, and total expenditures on development of the V-2 and the atomic bomb, the Nazis spent as great a proportion of their wartime budget on the former as the Americans did on the latter. In view of the V-2's abject failure to fulfill its role as the Reich's premier "revenge weapon," we can only characterize the program as a colossal waste of effort. Viewed in this light, British bombing paid yet another significant dividend, even if it went unmentioned by air intelligence experts.²⁵

Generalleutnant Josef Schmid, Commander of *I Jagdkorps*, which controlled all *Luftflotte Reich* day and night fighters from the end of 1943 to VE Day, said after the war that Bomber Command had done little of consequence prior to the 1000-plane Cologne raid in May 1942. After that, however, the systematic, increasingly accurate, and steadily heavier nature of the offensive magnified bombing's indirect effects, as Schmid put it, to an unbearable extent. Bomber Command's expert ability to find and bomb targets by fall 1944 made the Second Ruhr Offensive even worse than the first. Based on this increasing accuracy and level of damage, Schmid believed it would only have been a matter of time before Bomber Command city

attacks paralyzed the German war economy by destroying transportation nodes, doing direct damage to industries, and maximizing friction.²⁶ Like Speer, who said American bombing did more damage than the British, Schmid may have been catering to his interrogators; but his views are nonetheless worth considering in view of the increasing body of evidence pointing to Bomber Command's effects on the Reich's war effort.

Transportation and Oil Offensives: Bomber Command Effectiveness Confirmed Again

It is also important to remember the grand- and military-strategic contexts within which Bomber Command operated. Bomber Command's leadership had orders to carry the war to Germany—and it was the only instrument for doing so until 1944. In fact, there is clear evidence that Bomber Command's city bombing, while clearly not decisive, did create very significant difficulties for German war production. It did so in part because, as both Richard Overly and Adam Tooze have noted, the German war economy was already stretched much more tautly than previous scholars recognized.²⁷ Bomber Command raids were thus hitting much harder at the Reich's war economy than was previously understood. In this sense, Bomber Command achieved the objective set for it by the CCS. The bravery and sacrifice of the command's aircrews clearly mattered, both in terms of shortening the war and the Grand Alliance's casualty lists.

The British contribution also had strategic effects in the sense that Bomber Command was a key organization in the creation of a mature Allied air intelligence organization, which facilitated increasingly effective heavy-bomber campaigns. These culminated in the transportation offensive to isolate the Normandy battle area from German reinforcements and supplies (in particular fuel), the oil offensive, and the transportation offensive against the Reich itself. These three campaigns proved crucial to the speed with which the Allies won the war in Europe because they undermined German battlefield mobility, all but grounded the Luftwaffe, and collapsed the German war economy—an economy already much-weakened, as we have seen, by earlier Bomber Command attacks.

The oil and transportation offensives could not have succeeded without heavy Bomber Command involvement. With regards to the oil offensive, heavy-bomber crews dropped 509,206 tons of bombs on enemy targets up to May 1944, but only 5,670 (1.1 percent) on oil targets. From 12 May 1944 to 8 May 1945, they dropped 191,256 tons on 87 German oil-producing targets (16 hydrogenation plants, 9 Fischer-Tropsch plants, 40 refineries, and 22 benzol plants). They made a total of 273 raids comprising 61,712 sorties on synthetic oil plants alone between May 1944 and April 1945. It is also significant that Bomber Command crews flew 109 of these raids. Given the much greater bomb tonnage they delivered (remember that the Lancaster carried 14,000 lbs. of bombs and the B-17G only 6,700), the British deserve at least equal credit for the oil offensive's success. Indeed, given the short days and bad weather of fall and winter 1944-45, Bomber Command assets were the only ones with sufficient payloads

(both in terms of total weight carried and huge munitions such as the 4,000 lb. "Blockbuster" with its immense blast damage), and accuracy to destroy large synthetic oil plants in central and eastern Germany.²⁸

Given the Allies' determination to destroy Germany's oil industry, and with it the *Wehrmacht's* ability to fight a war of maneuver, they put more than enough bombs on target. The results were catastrophic for aviation fuel production, which averaged 170,000 tons per month until April 1944. In June it was 52,000 tons, in December 26,000, and in March 1945 zero. The figures were nearly as grim for gasoline production: 121,000 tons up to April 1944, 75,000 in June, 50,000 in December, and 39,000 in March 1945. As a result of the oil offensive and major combat operations, total stocks of finished POL products dropped from 1,372,000 tons in April 1944 to 436,000 tons by January 1945. Gasoline comprised only 120,000 tons of this and there was almost no aviation fuel.²⁹ The importance of these drastically reduced production figures becomes clearer when we consider Speer's comment that "The possible German production in 1944, excluding Romania, would have been adequate to cover requirements. It would have guaranteed the mobility of the Army and Air Force."³⁰ Combined with the 245,400 tons of lost production from Romania, total losses from 1 April 1944 to 31 December 1944 were 2,489,000 tons, a quantity which, said Speer, *would have met all German requirements for 1944*.

As for the effectiveness of transportation attacks against the Reich, any criticisms must take into account an issue of fundamental importance: until February 1945, and again from late March to VE Day, they were often focused on assisting the Allied ground advance, and appropriately so. The entire heavy-bomber effort relating to the Normandy campaign was designed to isolate the battle area to the maximum possible extent while creating pervasive fuel and ammunition shortages. In coordination with "tactical" air assets, it did so remarkably well. By the end of June 1944, German train movements in France were already down 90 percent, German army units had demotorized in a losing effort to resupply by truck, and ammunition shortages worsened by the week. Bomber Command heavies played a vital role in this process by bombing over 70 percent of the most vital French and Belgian marshalling yards with devastating accuracy.³¹

With respect to the transportation campaign against the Reich, CSTC minutes from an 8 November 1944 meeting noted that transportation raids from September to the start of the Ardennes offensive were designed to provide the greatest possible assistance to ground operations on all fronts. Next in importance was exerting maximum pressure on German war production by attacking railroads and inland waterways, with the ultimate objective of collapsing the Reich's war economy. By 10 February 1945 the CSTC had developed a detailed plan for attacks on transportation assets leading to and from the Ruhr.³² The plan was approved at the Air Commanders' Conference on 18 February, due in large part to Tedder's efforts. This was perhaps late, as Alfred Mierzejewski has argued, but as he makes clear, it also had the desired effects over time. The delay in this second major transportation offensive was in part the result of two unforeseen developments: the diversion of heavy bombers to interdiction attacks during the Ardennes offensive, and the subsequent effort to delay the

movement of 6th SS Panzer Army from west to east (the *raison d'être* for bombing Dresden). Again, one confronts the almost unbounded aspect of the Reich's transportation network as a target set.

Most German officers and civilians interrogated after the war said destruction of railroads and canals was the most important factor in the speed and totality of Germany's defeat. Only Albert Speer and Hermann Göring thought oil more important.³³ However, several officials, including *Generalfeldmarschall* Erhard Milch and Speer himself, recognized that making such a choice was senseless in view of the degree to which transportation and oil raids were intertwined and complementary. Milch observed that "The decisive moment was relatively late; it happened when you started large-scale attacks on our synthetic oil plants simultaneously with attacks on our communications."³⁴ Synergy of effects between the two, appearing in vital and often unlooked-for effects on the German war effort, proved extremely significant in undermining Germany's war effort.

Although this short assessment of Bomber Command's contributions to Allied victory in Europe is far from comprehensive, there can be no doubt that Harris' crews did their part in a variety of important ways, from creating the Third Reich's first armaments crisis and industrial dispersal during the 1943 Ruhr Offensive, to diverting huge numbers of resources to air defense, to playing, in many ways, leading roles in the oil and transportation offensives. Every one of these accomplishments cost the Third Reich's war effort dearly, and the ever-increasing friction and pressure Allied heavy bombers brought to bear—including, in a very significant sense, those of Bomber Command—ultimately undermined Nazi industrial production in every way that really mattered, ran the German military out of fuel and thus destroyed their mobility, and ultimately collapsed the German war economy. If the moral issues associated with Bomber Command's role in the war have held doggedly to center stage, perhaps it is time for us to think more deeply about the very real and effective things Bomber Command did to speed the end of the war, save the lives of Allied soldiers and European civilians, and help inflict such a serious and total defeat on the Third Reich that Germany has, since 1945, become one of least warlike countries on the planet. And, who knows, perhaps someday the command's brave airmen may even receive the campaign medal they so richly deserve.

Notes

¹ Sir Charles Webster and Noble Frankland, *The Strategic air Offensive against Germany 1939-1945, Volume III, Victory* (London: Her Majesty's Stationery Office, 1961), 112.

² John Terraine, *The Right of the Line* (Hertfordshire, UK: Wordsworth, 1997), 682-684; Denis Richards, *RAF Bomber Command in the Second World War: The Hardest Victory* (London: Penguin, 2001), 301-303; Max Hastings, *Bomber Command* (London: Pan MacMillan, 1999), 352; Randall Hansen, *Fire and Fury: The Allied Bombing of Germany, 1942-1945* (New York: NAL Caliber, 2008), 289, 291, 295.

³ A. C. Grayling, *Among the Dead Cities: The History and Moral Legacy of the WWII Bombing*

of *Civilians in Germany and Japan* (New York: Walker and Company, 2006), 267-268. See also Stephen A. Garrett, *Ethics and Airpower in World War II: The British Bombing of German Cities* (New York: St. Martin's Press, 1996), 209. Hans Rumpf provides one of the strongest moral arguments against bombing in *The Bombing of Germany* (New York: Holt, Rinehart, and Winston, 1963).

⁴ Adam Tooze, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (New York: Viking, 2006), 431, 513, 570-573, 597-602, 606, 671; Richard Overy, *War and Economy in the third Reich* (Oxford: Clarendon Press, 1995), 373-374.

⁵ Diane Putney, ed., *Ultra and the Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1987), 42.

⁶ Overy, *War and Economy*, 373.

⁷ Ultra intercepts CX/MSS T67/94 (19 January 1944), T108/47 (28 February 1944), and T131/7 (22 March 1944), noted in Stubbington, Appendix A, Hut 3 Highlight Reports, 120.

⁸ Tooze, 513; Horst Boog, "Harris: A German View," in Sir Arthur T. Harris, *Despatch on War Operations 23rd February, 1942 to 8th May, 1945* (London: Frank Cass, 1995), xlii-xliii.

⁹ Tooze, 570-573.

¹⁰ Tooze *Wages of Destruction*. This brilliant work, based on German archival sources, gives us a new, compelling, and very different view not only of the German war economy, but of the effects of bombing. Tooze's work is in many ways a continuation of R. J. Overy's groundbreaking study, *War and Economy in the Third Reich*. For the myth of under-mobilization, see Tooze, 431. For the effects of the Ruhr Offensive in 1943, see 597-602. Overy notes on 31 that bombing in 1944-45, once again concentrated on the Ruhr and indeed most of Greater Germany, led to a second and much larger round of dispersal of German war industry and the eventual regionalization and collapse of the German war economy as the transportation system undergirding it virtually ceased to exist.

¹¹ Tooze, 597-598, 671.

¹² *Ibid.*, 602.

¹³ WF, Vol. 2, 258.

¹⁴ Overy, *War and Economy*, 373-374.

¹⁵ Tooze, 606.

¹⁶ USAAF, *ULTRA and the History of the United States Strategic Air Force in Europe vs. the German Air Force* Frederick, MD: University Publications of America, 1980), 46. This source is a verbatim reproduction of a report written by Lieutenant Colonel Richard Haines, one of the few American officers with direct access to ULTRA decrypts, to his superiors at the end of the war, summarizing their effects on the air war.

¹⁷ Overy, *War and Economy*, 373-374.

¹⁸ USAAF, *ULTRA*, 15, 18-19, 44, 58, 80; Public Record Office, *The Rise and Fall of the German Air Force 1933-1945* (London: Public Record Office, 2001), 274.

¹⁹ Sebastian Cox, "Introduction." In BBSU, xxix, xxxiv; Sebastian Cox, "Introduction," in Harris, *Despatch*, xxviii; Edward Westermann, *Flak: German Anti-Aircraft Defenses, 1914-1945* (University Press of Kansas, 2001), 202,

²⁰ Cox, "Introduction," In BBSU, xxix; Westermann, *Flak*, 202, 216-218, 294-298.

²¹ Richard Overy, "An Assessment of the Strategic Bomber Offensive," in Royal Air Force Historical

Society (RAFHS), *Reaping the Whirlwind: A Symposium on the Strategic bomber Offensive 1939-45* (London: RAFHS, 1993), 31.

²² Horst Boog, "The German Defences," in *Ibid.*, 25.

²³ WF, Vol. 2, 258.

²⁴ See Christina Goulter, *A Forgotten Offensive: Royal Air Force Coastal Command's Anti-Shipping Campaign, 1940-1945*, (London: Frank Cass, 1995); BBSU, xxxviii; RAFH, *Air Intelligence*, 63-64; Probert, 99; Denis Richards, *RAF Bomber Command in the Second World War* (London: Penguin Books, 1994), 180-183, 298-299.

²⁵ Michael J. Neufeld, *The Rocket and the Reich* (New York, The Free Press, 1995), 273; Williamson Murray, "Reflections on the Combined Bomber Offensive," *Militärgeschichtliche Mitteilungen* 51 (1992), Vol. 1, 81.

²⁶ David Isby, ed., *Fighting the Bombers: The Luftwaffe's Struggle against the Allied Bomber Offensive* (London: Greenhill, 2006), 121.

²⁷ Tooze, 570-573.

²⁸ USSBS Oil Division, *Oil Division Final Report*, 2nd Ed., January 1947, 1-2, 4 and Figure 2, 86-87.

²⁹ *Ibid.*, 25, Table 12 and 28, Figure 23.

³⁰ CCG, FIA, 8 November 1945, 30, AIR 20/8780, PRO.

³¹ See Chapter 9 in Robert S. Ehlers, Jr., *Targeting the Third Reich: Air Intelligence and the Allied Bombing Campaigns* (Lawrence, KS: University Press of Kansas, 2009).

³² "Review of the Operations of the Working Committee (Communications), Combined Strategic Targets Committee, October, 1944 – May, 1945," 14 June 1945, 20-21, AIR 40/1516, PRO.

³³ The Germans' military doctrine and plans, and indeed their very conception of war itself, were inextricably intertwined with and dependent upon the *Reichsbahn*. It therefore seems likely that most German senior officers had a predisposition towards ranking transportation attacks higher than oil attacks.

³⁴ CSDIC (UK), Interrogation Report CS/2126, entitled "Generalfeldmarschall a.D. Milch," 23 May 1945, 1, Spaatz/B134, LOC. Emphasis added. Milch included railroads and inland waterways as "communications" targets.

Balanced Air Power in an Age of Austerity – The Leadership Challenge

By Air Commodore (Ret'd) Dr Peter Gray

This article examines some of the challenges in funding air power in times of financial stringency. A version of this paper was presented to the Chief of the RAAF's Conference this year and a shortened version to the RAeS Annual Conference. The article points out that air power must be balanced along with the wider interests of defence and not just in terms of a balanced air force. Furthermore the balancing act needs to be seen in terms of capabilities and not just the traditional issues around legacy platforms.

Introduction

It is all too easy to reach for a standard text on strategic leadership and nod wisely over the key factors that differentiate strategic leadership from lower forms of the art. It is even easier to produce powerpoint slides of the various attributes.¹ The real challenges of developing senior leaders are all together different with a range of issues from succession planning, through identifying required competencies, to delivering credible interventions.² Yet it is still instructive to distil some of the literature to identify some of the facets that go to make up the Leadership Challenge. One of the key roles of strategic leaders is the identification, and articulation, of the vision and purpose of the organisation as a whole. Given that no entity can operate in total isolation, this vision must be compatible with other organisations which operate in parallel, or in a hierarchy: the strategic leader must be adept at working those interfaces, especially at the political level.³ This will be developed further in this paper with an examination of the concept of operational art. In terms of describing strategic leadership, the literature and more importantly its practitioners, are unanimous in confirming that it is invariably complex and ambiguous. Its problems are rarely 'simple' capable of linear solutions. Rather they are 'wicked problems' which require a high degree of leadership (rather than management) and clear intellectual ability.⁴ The task of providing balanced air power in an age of austerity – in any country – epitomises these leadership challenges.

This paper does not purport to be a blueprint for the senior leadership teams involved in these tasks. It does, however, aim to identify some of the challenges and provoke discussion on the complex issues involved. One of the key interfaces in preparing a balanced air power capability, and more importantly (arguably) in deploying it is that ability to work alongside allies in a credible and convincing manner. Although military action in a unilateral, or regional, situation cannot be excluded, the most demanding scenarios will involve working alongside the United States. This brings its own benefits, but also brings its challenges in terms of parity in technology and scale of contribution (including the need to be logistically self-supporting). This paper will examine some of the issues involved in this including some of the 'softer' issues such as alignment of political goals, legitimacy and the human element. Although the paper will include historical examples, these will be extended to present and future challenges.

Balanced Air Power

The enduring qualities of complexity and ambiguity, along with the themes of vision and purpose, are immediately evident in any attempt to define 'balanced air power'. The first issue is that, at the truly strategic level – as opposed to an academic discourse or discussion in a bar – air power is a necessary part of a more broadly based balanced defence capability constituted to realise a nation's vital interests. These may be expressed in purely national terms or in the context of wider alliances whether formal or ad hoc. By definition, the defence element of national interests can be discussed in isolation, or in a more broad ranging

perspective which includes security policy.⁵ Although this may seem obvious to the casual observer, achieving this in reality can be very difficult. If, however, it is assumed that the overarching policy or strategy is in place, then the debate shifts to the military strategic level and the question becomes one of how much of a particular capability or role is required and how it can best be achieved in an affordable manner.⁶ For example, capabilities such as anti-submarine warfare (ASW), lift, or air defence can be provided in a variety of ways and is often best considered in combination with assets from each of the components (simply land, sea or air, but could include special forces and so on). The so-called Dowding-system which provided the intelligence gathering, command, control and layered defences for the Battle of Britain included elements of all three Services integrated with civilian authorities such as the telephone engineers provides an example of a sophisticated comprehensive approach to a strategic challenge. The bottom line in all of this is that end results can be achieved in a variety of ways depending on circumstances and factors such as finance.

Inherent in this emerging discussion is a potentially deeper problem over terminology. It is all too easy too easy to get embroiled in debate over terms or concepts such as effects based operations, revolutions in military affairs, network enabled warfare and capability based defence. The ensuing maelstrom of doctrinal jargon risks an early descent into dogma, particularly when some concepts appear to be enduring and others disappear from vogue based on nothing more logical than changes in personalities at senior leadership levels. At the other end of the spectrum, there is a real risk that the debate becomes centred entirely on platforms. In many ways, this is understandable at all levels of the enterprise. First of all, for senior leaders, and their staffs, this is what they grew up with either in flying the aircraft, operating the systems or even mending them! Aircraft, their systems and their crews form Squadrons which are deeply embedded in the organisational culture of all air forces. From a wider perspective, the aircraft and their systems are what defence industry makes – either domestically or on a global scale from which the component parts can be purchased ‘off the shelf’. Importantly, the financiers are able to attribute cost to the various lines that contribute to a programme from the aircraft, through its operating systems, to crews and training. But this can be dangerously seductive in that neither approach (platform nor conceptual) adequately describes the air power capabilities that have to be balanced to produce a comprehensive contribution to defence and wider national security.

It is worth considering the broad roles of air power in order to analyse their respective contributions to the formulation of a balanced capability. In all doctrinal or conceptual examinations of air power, control of the air is invariably considered to be of prime importance.⁷ The standard refrain is that control of the air allows component commanders the freedom to execute their plans free from enemy air intervention and vice versa. Loss of control of the air can lead, at worst, to catastrophic defeat, or at the very least, the need for commanders to resort to more costly or labour intensive means of carrying out specific tasks. In the period since the end of the Cold War, it has become easy to take this for granted in both time and space. An immediate example of the quest for control of the air is the Battle

of Britain, but for contemporary operations, the evacuation from Dunkirk provides a useful example of control of the air, limited in time and space to the period when the Royal Navy was embarking troops from the harbour wall and Park was able to suppress Luftwaffe activity through the deployment of his fighters in large formations. An interesting contemporary example could be the use, by an asymmetric opponent, of a co-ordinated counter-air operation involving ground attacks on air bases, surface-to-air missiles, small-arms fire and unoccupied aerial vehicles (UAVs) designed to deter or inhibit allied air operations.

Air mobility in contemporary operations is of huge importance at both the strategic and operational levels. In the post Cold War era, it became fashionable to talk about expeditionary operations as the most likely scenario in which armed force would be used. But this has its own challenges with the cost being a major issue. The lift capability has long been something of a Cinderella with only just enough available. As forces are used and deployed over considerable distances in a sustained operation the wear and tear of aircraft becomes a serious factor necessitating far earlier replacement. The same applies to use in theatre of aircraft such as the C130 and the helicopter force. The nature of current operations provides immediate evidence of the requirement for rapid mobility in both deployment of force and recovery of casualties. By the same token, the air-to-air (AAR) refuelling capability is essential in ensuring that limited air assets can be used over prolonged periods.

For at least the last century, advocates of air power have preached control of the air, tolerated air mobility and acknowledged the need for intelligence gathering. But in their souls, they have believed fervently in the use of air power for offensive action. British, and American, air strategy in the Second World War was founded on this belief, with many of its more extreme exponents stating that air bombardment would obviate the need for a land force invasion. Although this did not prove to be the case in the defeat of Nazi Germany, the air offensive against Iraq in 1991 certainly made the task for the ground forces considerably easier than might have been. As the doctrine manuals make clear, air attack is a complex capability ranging conventional kinetic activity through to influence operations. Contemporary operations in both Iraq and Afghanistan has shown that influence can work both ways with what can be depicted as indiscriminate air attack causing unnecessary casualties even though the real cause may have been accidental, or inflicted through other means (with artillery frequently the perpetrator).

Finally, and by no means least, the use of air platforms for the gathering of all forms of intelligence has been an essential part of the development of air power since the earliest days of balloon and kite flight. From directing artillery fire over the Trenches of the First World War to the focus on choke points, lines of ground manoeuvre and insurgent activity in Afghanistan the requirement has been consistently high. The need for situational awareness remains an enduring factor in warfare. But as warfare has developed, tolerance of casualties has diminished whether the cause is enemy action or friendly fire. The exponential improvement in communications has, unfortunately, not sated commanders' and politicians' appetite for

information. Conversely, indeed perversely in some cases, it has only increased the requirement for streams of data whether in the form of statistics or live video footage. The resulting compression of the layers of command and control brings its own leadership challenges.

At first sight, this review of the roles, or capabilities, of air power suggests that a balanced contribution would require the ability to carry out each of these. But this is too simplistic in a number of ways. In the first instance, those air forces that have the luxury of being able to operate within a formed Alliance such as NATO may elect only to contribute to limited roles leaving other nations to do the AAR, ASW, strategic lift or offensive air. This was certainly evident during Allied Force operations over Yugoslavia where there was a surfeit of air defence aircraft. Secondly, a nation may decide, for a variety of reasons, completely to forego a role or capability; the demise of RNZAF fast jets provides an immediate example. The third factor is that the wider defence requirement may be carried out by components other than air. Arguably, it may be possible to do all ASW from seaborne assets. Likewise it may be possible, if there is a very high probability of being restricted to littoral conflict, of leaving all lift to shipping. Similarly, airlift could be restricted to special forces insertion and recovery only. These are all issues of choice at the political and strategic levels.

The reality, however, for many nations is more complex. Some will decide for a variety of reasons, such as maintaining an industrial base to attempt to balance their capability spread.⁸ An alternative motivation maybe to support a unique system such as an independent nuclear deterrent for which certain key components are required to be under unequivocal sovereign control. Softer issues, such as national prestige may also play a part. The motivating factors can become important, for any nation, not only in coming to the decision that they will adopt a force posture that allows an element of each of the roles to be maintained, but also will condition the depth and the breadth of the elements of each of them. This then is the area in which the complexity of the leadership challenge comes to the fore. Taking ISTAR for example, just how many systems, reporting through and to whom, will the national component commander need, and how much can be afforded? Still with intelligence gathering, the interoperability with allies, especially America, will also determine the extent of the packages available. Likewise in deciding upon an offensive air capability, the debate goes far beyond the platform and must embrace the types of weapon system likely to be acquired, the scope for its deployability, sustainability and issues such as its legitimacy in any likely conflict.⁹ Similar considerations arise in the case of air mobility where strategic airlift, AAR and a sizeable rotary wing component could well be the entry level requirements for serious coalition warfare; and would certainly be essential for any unilateral operation at range.

A balanced air power capability is therefore a multi-dimensional conundrum the solution to which must be tailored to meet the strategic political, regional, domestic and industrial situation a nation is in presently and likely in the future. Although it is possible, especially within a major Alliance, to drop whole air power roles, the likelihood is that a balanced

capability will embrace elements of the four detailed above. The key question of balance comes in deciding the balance between the roles and the depths of the capabilities within each of them. There will inevitably be a wide range of factors influencing this balance including a defence industrial base, the immediate requirements of current operations, or the most likely (or most dangerous) future conflict.

There is always a great temptation to use vocabulary such as 'capability gap'. The various factors combine into a very complex capability matrix which must be closely examined to identify the 'capability gaps'. At the same time, an equivalent risk matrix is required to enable analysts and planners the opportunity to identify, and classify the risks inherent in making cost savings in specific areas. These risks can then be either accepted or mitigated. If they are accepted the process should automatically feed this back into the assumptions and constraints on current and future policy making. Each of these matrix exercises is variable over time with delay often increasing risk in all of its guises. For all nations, including the United States and notwithstanding its superpower status, the financial resource aspect will be a controlling factor. It is highly improbable that there will ever be a surfeit of resources and risk therefore will be ever-present.

An Age of Austerity

At its simplest, the expression 'austerity' implies little more than the dictionary definition of 'harsh or stern'. In an economic context, this could be extended to include the strictness of the spending regime especially in times of economic hardship. In a more contemporary, and less general, context the definition would embrace the challenges of global recession, banking crises leading to the shortage of credit to industry, all in the face of unprecedented demands on service personnel and materiel. These challenges, jointly and severally, make the provision of balance air power all the more difficult. Yet it could be argued that these conditions of hardship are enduring, albeit in different guises. Except in the possible conditions of total war experienced between 1939 and 1945, financial strictures are the norm rather than the exception. For Britain, its colonies and Empire in this period, there was no 'blank cheque' for defence expenditure as the bills had to be paid either from gold reserves or in the form of loans to the United States. Even in this extreme situation other resource restrictions rendered the conditions austere. The first of these was the shortage of suitable personnel for a wide range of tasks. The high calibre, well-educated young men were in great demand as NCOs and junior officers in all three Services, in Industry and the ever-growing ranks of the RAF in general and Bomber Command in particular. The highly skilled workforce needed to build and salvage the aircraft in which they were to fly was supplemented to a welcome degree by women, but sadly few had the opportunity to train or qualify as engineers. Although the situation today is by no means as bleak, there is still a degree of austerity in that the top quality young men and women required to populate an air power world are in arguably greater demand from competing career fields, especially in cultures where the rigours of military and possibly perceived political incorrectness bring extra stress.

The hierarchical nature of military organisations also precludes suitable talent being recruited at mid-career levels or to fill vacancies at strategic leadership levels.

In some ways, contemporary operations have a degree of similarity with the Second World War in that materiel was (and is) actually expended – rather than just be allowed to gather dust on the quartermasters' shelves prior to disposal as was the norm for the Cold War. This in turn brings its own real challenges, first in terms of the cost of the bullets, missiles and the considerable impact on the platforms themselves which frequently have to operate at much higher levels of usage and climatic deterioration. At the highest levels of leadership, these challenges bring in the commercial issues of the cost of configuring defence industry for vastly varying rates of consumption. Being able to surge production of low density, high cost items such as missiles is an expensive and high risk enterprise with shareholder not known necessarily for charity or allowing patriotism to outweigh dividends. The same is arguably true of being able to provide operational essentials that had not been budgeted for in a peacetime situation, but are urgently required for the conflict at hand.

The majority of these issues could be taken to apply to all nations contemplating entering a conflict zone. But for some players, there are additional factors that follow from these challenges. Often in a time of extreme financial stretch, investment in research and development is an early casualty. Some nations have no choice but to maintain a domestic defence industry, where access to outside markets may be denied (such as China, North Korea or Israel). But for all, there are considerable areas of risk in disinvestment. Some niche areas scientific or technological research are so specialised that the loss of a few key people due to redundancy, or a brain drain, could lead to an irrevocable loss of capability. Even for those nations that do not wish to maintain a domestic, or sovereign, design capability need sufficient capacity to be able to act as an 'intelligent customer'. This in turn begs the questions as to just how easily previous operators (aircrew in the main) are able to keep pace with technological developments to be able to fulfil this role. Nowhere is this more evident than in software engineering. In all of these areas there is an understandable, possibly inevitable, tendency to resort to sourcing equipment, research and development and even whole packages including contracted personnel from third party suppliers – often the United States. Whatever the cause of the austerity, there are no pain-free options.

Working with Allies

Precedents set since the end of the Cold War strongly indicate that most conflicts, on whatever scale, will be conducted in coalitions. These will often have many varied partners each with a differing range of capabilities and probably an even greater range of constraints under which they are forced to operate. Irrespective of the frustrations of this type of arrangement they have become a fact of life for a number of reasons. The first of these is that the formation of a broad ranging coalition actually bestows a higher degree of perceived legitimacy on the enterprise than a simple unilateral operation; this is true for domestic audiences and for the

wider international community. It is also possible that a junior coalition partner may well bring specific 'low density/high value' assets to the fight that are in short supply even in the lead nation's armoury.¹⁰ At this stage it is worth stating the obvious that it will invariably be the United States that fills this role; most nations' defence policies will be openly or tacitly based on this premise. The motivation for joining a coalition will inevitably vary from nation to nation reflecting the nuances in each country's unique interpretation on their own vital interests. Each nation will therefore have to build its own relationship with the lead nation, not least in order to exert influence.

This paper does not seek to provide a 'staff-college-perfect' solution of what makes an ideal coalition partner to a United States led coalition operation.¹¹ Rather it aims to analyse some of the major factors that have been evident in such operations, many of which will impact on the senior leadership challenge of preparing a balanced air power capability. It is overly simplistic to begin with the inevitable reminder that size is important. But there are also issues over the likely duration of the conflict and with anything other than a very short term engagement the challenges of roulement are likely to be significant. For a fast jet contribution to control of the air, or precision attack missions the planners will need to consider factors such as aircraft serviceability rates, mean time between failures, spares availability, ordnance stocks, crew capabilities and the ground support functions necessary to contribute to the planning and execution of the likely missions. These issues cannot be fixed 'on the night' and must be built into the balanced capability. All of this has to be logistically self-supporting in terms of spares provision, ability to deploy and recover and compatibility with the US and with the host nation (where appropriate). Countries that choose to buy off the shelf from US countries will have fewer problems even if they have only been allowed to acquire an 'export' version.

It can be useful to take this debate a stage further in terms of likely contributions to an Air Tasking Order (ATO). There are important factors at each stage of this process from its inception, through the planning phase into the actual formulation, dissemination and then translation into mission planning details. Each of these factors has its own subsets including access to IT hardware and software; communications equipment compatibility; possession of an air power capability required on the ATO; and softer issues such as a current awareness of US doctrinal thinking, language and vocabulary. Possession of unique, niche or critical assets or enablers greatly enhances the probability of inclusion in the planning process and the final execution. The aircraft likely to participate in ATO missions must be suitably equipped. On a major operation the ATO runs to thousands of lines potentially building massive situational awareness problems. These are invariably reduced by the use of appropriate equipment, familiarity with tactics and procedures and experience. But secure radios, LINK equipment and the opportunity to exercise with the US are not necessarily easily achieved. Inability to comply with the requirements laid down is likely to result in exclusion from the ATO; missions outside the formal planning process invariably come into the 'too difficult' category. If the balanced air power capability has been planned to be able to operate with US, these are critical issues

and not merely desirable even though they require a significant commitment in equipment, training and liaison with US colleagues.

One of the key challenges for senior leaders in coalition operations is a high level of ability in working the interfaces between coalition partners, home and other government departments (especially host nation) and multi-national (or non-governmental) agencies. Each of these will have their own agendas, interpretations of mandates and view on international legal issues. These potential minefields often manifest themselves in targeting issues or interpretation of rules of engagement. In extremes (hopefully, but not necessarily an infrequent occurrence) failure to agree or compromise can lead to national 'red cards' and a potentially very tense compression of the gaps between the operational and grand strategic levels of war. Even in a straightforward 'war fighting' situation, the multi-dimensional nature of the interfaces between nations, components and policy formers is both complex and challenging. In a 'Phase 4' or state-building environment, the complexities are magnified several fold. Integral to this process is a deep understanding of what makes and organisational culture and how these vary within and across nations.¹² Preparation of future air power leaders for this inherently challenging matrix of joint, combined, multi-cultural, intra-governmental and inter-governmental operations is problematic. These are 'wicked' rather than 'tame' problems requiring the highest levels of intellectual ability and leadership.

Development of the Multi-national, Multi-cultural Leader

The traditional approach to consideration of these issues has tended to be a reliance on the quality of the individuals recruited as officer cadets (often as teenagers) supplemented by a general staff training. In the ideal world future leaders will have had exposure to US practices and techniques through exercises such as Red Flag or, increasingly, in actual operations. It could, however, be argued that this is a linear approach which is not compatible with matrix challenge discussed above. Many nations take considerable pride in the through-life development of their officer cadre from single service specialists into future joint commanders. But even this begs the question as to whether enough is done on the wider development of senior NCOs and Warrant Officers who frequently have difficult and responsible roles to play in coalition operations from the flight line to the operations centre. Having accepted, from a defence planning assumption perspective, that coalition operations led by the US will be the norm rather than the exception, is enough done by the coalition leaders, and follower nations, to ensure that a sustainable number of future leaders have had access to the appropriate education and training.¹³

A critical role in senior leadership is succession planning. Part of this aims to ensure that successive generations of senior leaders are able to build on the core values while embracing the wider elements of change brought about by the wider society. Military organisations face particular challenges in this arena as they are not able to bring in talent from the civilian world to bolster the 'through ranks' team. The literature on strategic and executive leadership

is clear that there is step change in the roles and requirements at high levels and it could be argued that not all nations adequately prepare their people for the transition.¹⁴ For air power leaders in particular, the skills and traits necessary to become a top class tactical leader are not necessarily those needed to run an organisation at senior levels and in many cases the promotion ladder does not reflect this identification of executive potential.

The leadership literature also consistently emphasises the intellectual challenges of working complex and ambiguous issues. At the popular press end of the spectrum, much has been made of General Petraeus holding a doctorate and including a significant number of similarly educated advisers on his staff. This raises further questions as to whether this level of military intellectualism is an unnecessary and time-consuming luxury; or whether it is an essential in the preparation of those destined to apply 'operational art'. Some air forces have institutionalised educational provision into programmes up to and including doctoral level in a formal series of fellowships.¹⁵ But few, if any, can emulate the US Schools of Advanced Studies (such as the Maxwell School of Advanced Airpower Studies), both in the scale of their courses and the systematic employment of their graduates in high profile appointments. Nevertheless, preparation of future senior leaders is as important a factor in creating a balanced air power capability as the provision of platforms, even in an age of austerity.

Conclusion

This paper has aimed to show that the planning and provision of a balanced air power capability is a more considerably more complex leadership challenge than the mere acquisition of a number of platforms able to fulfil the broad doctrinal requirements or roles. No age is free from its share of austerity in its various forms and the key is to provide a balance in depth and breadth appropriate to the context. There also has to be a balance between the national, regional and alliance requirements, particularly if a nation is to make a significant contribution to working alongside the United States. In such a case full logistical self-sufficiency is essential from spares to ordnance. Possession of niche, or specialist, capabilities can enhance the attractiveness of a force contribution. But again the situation is more complex than the straightforward provision of platforms and crews. For air power coalitions to function efficiently the absorption of national components must be seamless, otherwise the senior leader will have to spend a disproportionate amount of time and effort working the interfaces: this has been true of all such enterprises from Normandy in 1944 onwards. Training and education has to be in place to ensure that senior personnel understand the organisational cultures of the entities which they will be required to work alongside. This begs the question as to the adequacy of succession planning, identification of talent and ensuring that relevant interventions are in place. But this does not happen by accident, nor can it just be left for commanders, and their staffs, to 'make it all right on the night'.

It would not be unreasonable for senior leaders – political, military and civilian – to express the balance of capability (not platforms) in a matrix including depth, breadth and time. The same

can be applied to the challenges of working with Allies and for the development of future leaders. Gaps can be identified and the equivalent risk matrix mapped out to identify where problems can be bought out, mitigated or accepted. These are complex and ambiguous problems and deservedly attract the description 'wicked'.

Notes

¹ According to Stephen J. Zaccarro, *The Nature of Executive Leadership: A Conceptual and Empirical Analysis of Success*, (Washington DC: American Psychological Association, 2001), there are fewer decent studies on strategic leadership owing to the difficulty in identifying rigorous sample sizes to test. For a standard work, see John Adair, *Effective Strategic Leadership* (London: Pan, 2003).

² See Air Commodore Peter W. Gray and Jonathan Harvey, 'Strategic Leadership Education', in Colonel Bernd Horn and Lieutenant-Colonel Allister MacIntyre (eds.) *In Pursuit of Excellence: International Perspectives of Military Leadership*, (Kingston ON: Canadian Defence Academy Press, 2006). The literature on senior leadership makes no terminological differentiation between senior, strategic and executive.

³ This in itself provides an immediate challenge because many senior leaders are the product of their very specific tactical backgrounds often leading to a tendency to revert to the silos from which they emanated. It is instructive to compare Air Chief Marshals Portal and Harris in this respect. The former was particularly good at working the interfaces whereas Harris had to be cautioned many times over his predilection for maintaining a very narrow focus. See Peter W. Gray, unpublished PhD Thesis, *The Strategic Leadership and Direction of the RAF Strategic Air Offensive against Germany from Inception to 1945*, University of Birmingham, 2010.

⁴ See H. Rittel and M. Webber, 'Dilemmas in a General Theory of Planning', *Policy Sciences*, 4 pp. 155-169. For the application of this typology to the military environment, see Keith Grint, *Leadership, Management and Command; Rethinking D-Day* (Basingstoke: Palgrave Macmillan, 2008), pp. 11-18.

⁵ As an example of the UK conducted its recent Strategic Security and Defence Review within the context of a newly created National Security Policy.

⁶ This paper is not aimed at providing a detailed discussion on the differences between policy and strategy, not least because the terms can be interpreted in differing ways between government departments and in different capitals.

⁷ For the UK view see AP 3000 (4th edn.), MoD, London 2010, p. 38; this uses the expression *primus inter pares*.

⁸ As was the case in the UK continuing with its Carrier Strike programme.

⁹ Some these issues arose in the UK debate over whether to retain the Harrier or Tornado. Legitimacy issues saw the demise of cluster bombers and anti-airfield munitions such as JP233.

¹⁰ This was certainly the case with air operations over Iraq for many years, and over Afghanistan, where UK probe and drogue tankers have refuelled USN and USMC aircraft.

¹¹ The author has attended and lectured on a number of US JFACC Programmes where these issues were discussed in detail.

¹² The organisational culture includes the outward trappings of badges, buildings and so forth. As one moves closer to core beliefs the requirements for understanding what makes folk 'tick' becomes more important. It can be seen that the cultures within the USAF, air elements of the USN and the USMC differ. Likewise between Foreign Affairs Departments and so forth.

¹³ Both words are used with deliberation here. Education could include access to SAAS programmes and increased participation in Staff and War Colleges remotely if necessary.

¹⁴ See Gray and Harvey, 'Strategic Leadership Education'.

¹⁵ The author had the privilege of being awarded the first RAF Portal Fellowship providing support for his doctorate.

War at a Distance? – Some Thoughts for Airpower Practitioners

By Group Captain Clive Blount

Based on research conducted at the Development, Concepts and Doctrine Centre in the process of producing Joint Doctrine Note 2/11 'The UK Approach to Unmanned Air Systems', this article looks at potential moral and ethical questions that may be faced in future warfare. As technology provides more ways of engaging lethal force from afar, the decision-making process will present future military and political leaders with new dilemmas as to how such systems may be used within the democratic way of war. The *legal* justification of such weapons is continually under review and is subject to much study, however, what is less discussed is the question 'Should we?' rather than 'Can we?' This article aims to identify potential areas for debate by examining the employment of unmanned aircraft in the future battlespace, with particular emphasis on growing autonomy. (Many of the principles discussed herein do, however, read across directly to other forms of remote warfare, including cyber). Whilst some of the ideas may initially appear somewhat conceptual, the author aims to show that a less than ethical approach can have a direct effect on campaign outcomes; a modern airman must have a clear awareness of the ethical and moral issues involved in remote warfare and this article aims to identify potential areas for future discussion and debate.

1. *A robot may not injure a human being or, through inaction, allow a human being to come to harm.*
2. *A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.*
3. *A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.*

Isaac Asimov – the 'Three Laws of Robotics'... Science Fiction!

Introduction

Over recent decades the 'western way of war' has involved the use of high technology and sophisticated firepower as an alternative to committing large numbers of troops on the battlefield. Conscious of the 'body bag' effect on public opinion in the latter stages of the US war in Vietnam, western powers have since sought to sacrifice expensive weapons systems to achieve their aims, rather than the lives of their citizens. Notwithstanding the apparently contrary lessons of the current COIN conflict in Afghanistan, recent developments have seen a proliferation of unmanned systems on the battlefield and, along with the advent of cyber warfare and new directed energy weapons (DEW), the means of achieving a military effect, remotely, are proliferating widely. The legal justification of such weapons is continually under review – indeed, every new weapon system, or change of use of a weapon system, must undergo a full legal review before it is fielded – but what is less discussed is the question 'Should we?' rather than 'Can we?' This article, based on research conducted at DCDC during the preparation of Joint Doctrine note 2/11 '*Unmanned Aircraft Systems; a UK Approach*,' aims to tackle some of the ethics - and morals-related questions of remote warfare by examining the employment of unmanned aircraft in the future battlespace, with particular emphasis on growing autonomy. Many of the principles discuss herein do, however, read across directly to other forms of remote warfare, including cyber. Whilst some of the ideas may initially appear somewhat ethereal and conceptual, a less than ethical approach can have a direct effect on campaign outcomes; a modern airman must therefore have a clear awareness of the ethical and moral issues involved in remote warfare.

Emotive language, particularly in media reporting, has engendered much speculation and discussion, often not well-informed, on the wider issues of operating unmanned aircraft in today's conflicts. Beyond the, unlikely, nightmare of a 'Terminator'-style killer robot running amok, there are some fundamental questions that must be addressed as we integrate increasingly autonomous weapon systems into the battlespace. Will the advent of increasing autonomy raise complex dilemmas centred on the moral and ethical justification of our actions? For instance, will future wars be fought remotely, at least initially, with little or no

loss of friendly human life? Is human nature such that the next arms race will seek to pitch increasingly complex unmanned systems against other unmanned systems or humans?

The first area for consideration revolves around the potential that unmanned systems may completely remove one's own forces from the risk of death in future warfare. This raises a number of interesting areas for debate, not the least being the role of risk to self as a 'policy limiter' when decision-makers opt for the use of force to achieve policy aims. Does it follow that the ability to use unmanned systems will, without risk to a friendly operator's life, lead more readily to the rapid escalation to full-on technological warfare of what would previously been considered, and tackled as, a simple diplomatic problem? In 1862, after the Battle of Fredericksburg, Confederate General Robert E Lee said, "It is well that war is so terrible – otherwise we would grow too fond of it."¹ If the risk of loss of friendly troops, with its attendant media coverage of repatriations and grieving families, ceases to be part of decision-makers' calculations when considering crisis management options, does the use of armed force as a policy tool become more attractive? Will decision-makers resort to war as a policy option far sooner than previously? In *On War*, Clausewitz himself suggested that it is the role of policy to prevent the escalation of the brutality of war to its absolute form via a diabolical escalatory feedback loop² – one of the contributory factors in restraining aggressive policy is the risk to one's own forces... and oneself. We must therefore ensure that we, as practitioners of modern airpower, consider this issue and fully understand the appeal of remote, risk-free, warfare to policy-makers. It is up to us as military advisors to ensure that we have a clear understanding of the potential pitfalls of such systems and that, by removing some of the horror of war (to our own side, at least), or at least keeping it at a distance, we do not risk losing our controlling humanity and make war more likely. As a contemporary example, the recent extensive use of unmanned aircraft over Pakistan and Yemen may already herald a new era in warfare; that these activities are exclusively carried out by unmanned aircraft, even though very capable manned aircraft are available, and that the use of ground troops, or other personnel, in harm's way has been avoided, suggests that this use of force is totally a function of the fact that an unmanned capability exists – it is unlikely a similar scale of force would be used if this capability were not available.

The next area for discussion is centred around a notion of 'fairness' or more importantly how to prevail in the 'war of ideas' that is inherent in modern warfare. Whilst not necessarily advocating the view of the school of thought that suggests that for war to be moral (as opposed to just legal) it must link the killing of enemies with an element of self-sacrifice, or at least risk to oneself,³ there is a clear possibility that, the use by the western nations of high technology unmanned platforms, offering no risk to their own personnel, may directly impact on the apparent legitimacy of their actions. Whilst notions of fairness are not necessarily appropriate in war, the UK, as a democratic nation 'cannot achieve long-term security and prosperity unless we uphold our values'.⁴ We must consider the war of ideas inherent in all modern warfare, particularly counter-insurgency operations.⁵ Legitimacy becomes a key battleground in this type of environment and, as David Whetham says in his book, *Ethics, Law and Military Operations*,

‘winning the narrative of the situation is just as significant as winning any tactical engagement.’⁶ In such operations, which tend to be enduring, the onus is on the counter-insurgent to maintain his legitimacy; the insurgent gains every time a mistake is made, be it a bomb landing in the wrong place or a potential war crime. The counter-insurgency operation must be perceived as ethically sound, above reproach, and the ill-considered use of armed unmanned aircraft offers an adversary a potent propaganda weapon. Remote killing from altitude, at zero risk to self, enables the insurgent to cast himself in the role of underdog and the West as a cowardly bully – a bully that is unwilling to risk his own troops, but is happy to kill indiscriminately from afar. To us, in the west, projecting lethal force from an air conditioned control cabin may be part of a ‘limited conflict’... a ‘war of choice’; to the adversary in the target area it is very much a war of survival – both personally and for his cause. There is much press coverage of ‘Drone’ attacks in Pakistan which stresses this effect. The New York Times reports that ‘...in Pakistan’s cities there is a different impact: a sense that the gizmos, created to instil fear in America’s enemies, only reveal the fears of Americans to take casualties themselves. There, a song of protest taunts the world’s most powerful country for sending robots to do a man’s job:

*America’s heartless terrorism
Killing people like insects
But honor doesn’t fear power’⁷*

The discussion thus far has mainly been somewhat biased towards the pitfalls of remote warfare. There is, of course a far more balanced argument to be made, and a number of areas exist where there may be a clear moral justification **for** the use of unmanned systems. There is obviously a moral responsibility on every commander to reduce loss of life - on both sides. As JDN 2/11 makes clear, there are a number of reasons why a commander may elect to use an unmanned solution, one of the main reasons being removal of the risk of loss of friendly aircrew. The use of unmanned aircraft is thus in itself morally justified. Bradley Strawser suggests that:

‘it is wrong to command someone to take unnecessary potentially lethal risks in an effort to carry out a just action for some good; any potentially lethal risks incurred must be justified by some strong countervailing reason’⁸

There is little objection, for instance, to the use of unmanned bomb disposal robots – why would you risk a human life unnecessarily when an automated alternative exists? As long as it can be clearly demonstrated that the current generation of armed unmanned aircraft are legal, and that targeting criteria are clearly mandated and followed, it is a relatively straightforward argument that the use of such systems is morally obligatory.

The other area where unmanned aircraft may provide a moral or ethical advantage is in the quality of decision-making their inherent properties afford the operator. The situational awareness provided by the sensors on a persistent unmanned aircraft, observing the battlespace

for long, uninterrupted, periods enables much improved decision-making and, most likely, more appropriate use of force. The ability to observe patterns of life over an extended period and to build an awareness, maybe even a true understanding, of the local situation should ensure clearer, more accurate kinetic targeting with a reduced chance of unwanted effects. This may be enhanced by the fact that the decision-maker operating such a system is likely to be sitting in the relatively stress-free environment of an air-conditioned cabin, possibly based in the relative safety of a home base, instead of in a fast jet cockpit, under threat of attack from the ground, having launched from an FOB which itself is under threat. However, as a reprise to a previous paragraph, it must be stressed that the use of armed unmanned systems in the 'war of ideas' will need to be carefully managed – will a desire to maintain the moral 'high ground' become Strawser's 'strong countervailing reason' to risk life?

Thus far, this article has addressed issues that apply equally to current, remotely operated systems, systems with a human in the decision-making 'loop'. By far the most controversial debates with regard to unmanned aircraft are reserved for the future vision of fully autonomous systems where human input may not be required, or indeed desirable, for the effective operation of the system. Increasing autonomy in unmanned systems brings an even more extensive portfolio of moral and ethical dilemmas and, as press reports of 'killer drones' in Afghanistan⁹ have shown, feelings are likely to run high as armed systems acquire more autonomy. It is perhaps appropriate at this stage to define what is meant by 'autonomy'. The descriptions 'automatic' or 'autonomous' unmanned aircraft are not clearly defined by either industry or in academic circles. In industry specifications and sales brochures the terms are often used interchangeably. JDN 2/11 notes that achieving agreement on clear definitions of these terms is required but that it is very difficult to achieve universal buy-in to any agreed lexicon. It offers MOD agreed definitions as follows:

*'In the unmanned aircraft context, an **automated** or **automatic** system is one that, in response to inputs from one or more sensors, is programmed to logically follow a pre-defined set of rules in order to provide an outcome. Knowing the set of rules under which it is operating means that its output is predictable.'*

Conversely:

*'An **autonomous** system is capable of understanding higher level intent and direction. From this understanding and its perception of its environment, such a system is able to take appropriate action to bring about a desired state. It is capable of deciding a course of action, from a number of alternatives, without depending on human oversight and control, although these may still be present. Although the overall activity of an autonomous unmanned aircraft will be predictable, individual actions may not be.'*¹⁰

Increasing autonomy is likely to be driven by both a desire to make systems more effective in performing increasingly complex tasks, and by the requirement to make manpower

savings – enabling one operator to oversee a number of unmanned systems simultaneously. Increasing autonomy also provides back-up options should control data links be disrupted. There is also an increasing body of discussion that suggests that the increasing speed, confusion and information overload of modern war may make human response inadequate and that the environment will be ‘too complex for a human to direct’¹¹ and this has already been exemplified by the adoption of autonomous weapon systems in current operations in Afghanistan. For example, in the case of the Phalanx and Counter-Rocket, Artillery and Mortar (C-RAM) systems it can be clearly shown that there is insufficient time for a human initiated response to counter incoming fire. The potential damage caused by **not** using C-RAM in its fully automatic mode justifies the level of any anticipated collateral damage. We now see the role of the human in the loop, heretofore a legal requirement, as being eroded; what now is the role of the human from a moral and ethical standpoint in autonomous systems? Engaging and destroying an incoming Taliban rocket may be a suitable target for an automatic system - but what about an autonomous armed unmanned aircraft with a potential human target?

Most work on this area focuses on the unique (at the moment) ability that a human being has to bring empathy and morality to complex decision-making. To a robotic system, school bus and tank are the same - merely algorithms in a program - and the engagement of a target is a singular action; the robot has no sense of ends, ways and means,¹² no need to know **why** it is engaging a target. There is no recourse to human judgement in an engagement, no sense of a higher purpose on which to make decisions, and no ability to imagine (and therefore take responsibility for) repercussions of action taken. This raises a number of questions that will need to be addressed before fully autonomous armed systems are fielded. Whilst the majority of public debate on autonomous weapon systems is emotive, negative, and emphasises the more frightening aspects of robotic warfare, it is easy to forget that there could easily be a positive aspect. As just mentioned, robots themselves cannot be emotive, cannot hate. A target is a series of ones and zeros, and once the decision is made, by whatever means, that the target is legitimate, then prosecution of that target is made mechanically. The robot does not care that the target is human or inanimate, terrorist or freedom fighter, savage or barbarian. A robot cannot experience the ‘red mist’, it cannot be driven by anger or desire for revenge to carry out illegal or unethical actions such as those at My Lai;¹³ in theory, therefore, autonomy should enable more ethical and more legal warfare. However, we must be sure that clear accountability for the processes by which systems arrive at the targeting decision, often anthropomorphized as ‘robotic thought’, exists. This in itself raises a number of difficult debates. Is a programmer guilty of a war crime if a system error or coding fault leads to an illegal act? Can a robot commit a ‘war crime’ - where is the intent required for an accident to become a crime? Who is responsible for the death of human beings in a robot attack – Robot?.. Commander?.. Manufacturer?. The pace of technological development is accelerating and the UK must establish, quickly, a clear policy on what will constitute acceptable machine behaviour in the future; there is already a significant body of scientific opinion, supported by an increasing number of activists, that advocate the banning of autonomous weapons - and any research that may lead to such weapons – outright.¹⁴ There is also a growing acceptance in many

other areas that lethal autonomy is inevitable and must be managed and directed in an ethical way. There are no clear answers; technology may drive us in many different directions and it is impossible to forecast when and where developments will lead us – and the ensuing ethical dilemmas that may arise. The important thing is to have the debate, to discuss possible issues and to at least identify the main potential areas for concern. As Christopher Coker says in his treatise on Ethics in 21st Century War:

*'We enter a new century knowing all too well that our ethical imagination is still failing to catch up with the fast expanding realm of our ethical responsibilities. Robots are taking us even further away from the responsibilities we owe our fellow human beings.'*¹⁵

This article will now step back from the edge of science fiction to address an issue that is very much in the here and now... issues surrounding the human aspects of remote operators of armed unmanned aircraft. Kinetic operations being controlled from several thousand miles away, such as those in Afghanistan currently being conducted from the continental USA, raise a number of novel areas of concern. The concept of 'fighting from barracks', as it has been termed, raises a number of interesting areas for debate. Is the Reaper operator walking the streets of his home town, after he has completed a shift in the control cabin delivering ordnance in Helmand province, a legitimate target for enemy sympathisers as a combatant? Would an attack, for instance, by a Taliban sympathiser be an act of war under international law - or murder under the statutes of the home state? Does a person who has the right to kill as a lawful combatant whilst in the control cabin cease to be a combatant that evening on his way to a PTA meeting or offspring's soccer match?

More broadly, we must also fully understand the psychological effects on remote operators of conducting war at a distance. In the first instance it is important to examine the stress caused by the contrast between home life and warfare on a daily basis. It has been suggested that an examination of the lives of WWII RAF bomber crews based in the UK may provide an insight – or even the experience of the 1999 Bruggen-based Tornado wing, operating from their home base whilst attacking targets in Kosovo – although with the 20,000 remote *Reaper* hours milestone only recently passed we should have a fair body of relevant, contemporary evidence on which to base opinion. Perhaps current operators could be persuaded to comment in this Journal? A well known opponent of autonomous weapons, Prof Noel Sharkey of Sheffield University raises another psychological concern, which he terms Moral Disengagement. Sharkey quotes a number of sources indicating that remote operators may suffer disengagement from the enormity of the act of killing, adopting what he terms a 'Playstation mentality' and becoming more careless about decisions to kill.¹⁶ He recognises that there is little more than anecdotal evidence to support his assertions and more detailed studies of the stresses on remote operators needs to be carried out. Whether this detachment is any more pronounced than that of a bomber crew or modern fighter pilot remains to be seen, and the character and training of our professional crews will continue to be a major driver in ensuring the legal, moral and ethical use of our remotely piloted aircraft.

This article may have appeared somewhat of the 'Lily-livered liberal' variety to the majority of air power practitioners at whom this Journal is aimed. However, as the media frenzy accompanying the web-publication of JDN 2/11 demonstrates,¹⁷ this is an emotive topic and the use of armed force to further policy must reflect the society driving that policy. We must satisfy our public that our actions are in keeping with the standards and values they expect. This is not just a philosophical issue; it could prejudice campaign success. As another DCDC publication posits,¹⁸ the western high tech advantage is likely to be eroded as key military technologies proliferate – potential adversaries are almost certain to acquire autonomous systems. Different cultures may have very different views on what is perceived as ethical and moral; in addition, many adversaries may not have the transparent society or all-pervasive media attention that we in the west enjoy. It is possible therefore that we may face an adversary in the future whose freedom of action, with regard to autonomy, for instance, is considerably greater than our own. Careful and wide-ranging consideration of the emerging ethical issues is, therefore, required, so that an informed and convincing case may be argued for our use of the remote, and potentially autonomous, weapon systems of the future, in order to prevent our operations being unduly restrained in the face of a determined, unrestrained, foe.

Unmanned, and increasingly autonomous, weapons systems are likely to play an increasing part in modern warfare and unmanned aircraft will form an ever higher percentage of the air power contribution. Whilst the advantages of such systems are many, and increasing as technology evolves, there are a number of wider ethical issues involving their use that will need to be addressed if we are to utilise such systems to their full potential. This article has attempted to suggest some of the main areas for consideration in an effort to stimulate interest in the area and to start debate. Such debate is essential – a failure to properly justify remote warfare may severely constrain the use of otherwise war-winning systems, particularly against adversaries that may have a much greater freedom of action. Air Power Journal is a good place to tackle these issues.... Get writing!!

Notes

¹ James McPherson, *Battle Cry of Freedom*, (OUP: Oxford, 1988) p551.

² Carl Von Clausewitz, *On War*, trans. and ed. by Michael Howard and Peter Paret, (Princeton NJ: Princeton University Press, 1989) p606.

³ See discussion in P W Singer, *Wired for War*, Penguin: London, 2009, page 432.

⁴ William Hague, Foreign Secretary, 'Britain's values in a networked world', Speech at Lincoln's Inn, London, 15 Sep 10.

⁵ PW Singer, *Attack of the Military Drones*, in Brookings, June 2009. http://www.brookings.edu/opinions/2009/0627-drones_singer.asp?p=1 accessed 10 Jan 2011.

⁶ D Whetham (Ed), *Ethics, Law and Military Operations* (Basingstoke: Palgrave Macmillan, 2011) p19.

⁷ *The Downside of Letting Robots Do the Bombing*, <http://www.nytimes.com/2009/03/22/weekinreview/15MAZZETTI.html?fta=y> last accessed 18 Apr 11.

⁸ Bradley Jay Strawser, 'Moral Predators: The Duty to Employ Uninhabited Aerial Vehicles' in *The*

Journal of Military Ethics, Vol 9, Issue 4, 2010. p344.

⁹ For instance see the following <http://www.guardian.co.uk/uk/2011/jan/16/drones-unmanned-aircraft> last accessed 21 Feb.

¹⁰ Joint Doctrine Note 2/11, *The UK Approach To Unmanned Aircraft Systems*, dated 30 March 2011.

¹¹ P W Singer, 'Robots at War: The New Battlefield' in *The Wilson Quarterly*, Winter 2009. <http://wilsonquarterly.com/article.cfm?aid+1313> accessed 10 Jan 2011.

¹² See discussion in Christopher Coker, *Ethics and War in the 21st Century*, (Routledge: Oxon, 2008). p151.

¹³ The **My Lai Massacre** was carried out by US Troops in South Vietnam on 16 Mar 68. An unknown number (estimates range from 347–504) of unarmed civilians, the majority women and children, were killed. For a discussion see P Tripodi "Understanding Atrocities" in D Whetham (Ed) *Ethics, Law and Military Operations*, (Basingstoke: Palgrave Macmillan, 2011) pp173-188.

¹⁴ For instance, The International Committee for Robot Arms Control, www.icrac.co.cc.

¹⁵ Coker, p152.

¹⁶ Noel Sharkey, 'Saying 'No!' to Lethal Autonomous Targeting' in *Journal of Military Ethics*, Vol 9, Issue 4, 2010.

¹⁷ For instance, see <http://www.guardian.co.uk/world/2011/apr/17/terminators-drone-strikes-mod-ethics?INTCMP=SRCH>.

¹⁸ DCDC Publication *The Future Character of Conflict*.

Missile-Defence Dilemmas

By Dr David Gates

Shortly after coming to office in 2009, President Barack Obama ordered a wholesale review of the USA's rather controversial policy and plans regarding ballistic missile defence that he had inherited from the preceding administration under President George Walker Bush. The resulting *Ballistic Missile Defence Review Report* has led to substantial changes in approach that have ramifications for the defence of, not only North America, but also the whole NATO region and other countries that have linked their security to that of the USA. Not least because of developments in the Middle and Far East, missile defence is in any case one of the greatest and most pressing challenges within the realm of aerospace power. At the same time, however, it is one that is peculiarly fraught with political, technical and operational complexities. This article examines some of the dilemmas inherent in ballistic missile defence especially.

Introduction

It seems probable that in no aspect of aerospace power will millennial technology have a greater part to play than in missile attack and defence. Achieving control of the air in future conflicts will require a capacity to counter, not just the customary threat posed by crewed aircraft, but also that posed by opponents' ballistic and aerodynamic missiles, as well as the latter's cousins, remotely-piloted aerial systems (RPAS). This challenge is also compounded by the simultaneous proliferation of weapons of mass destruction (WMD), for these are as likely, if not more likely, to be delivered by an adversary's aerodynamic or ballistic missiles or RPAS as they are by crewed aircraft. This article will examine some of the dilemmas inherent in ballistic missile defence (BMD) in particular.

In summer, 1944, Britain became the first country to undergo attacks by ballistic and aerodynamic missiles and had to improvise the best shield that the technology of the day permitted. Whereas an integrated defence comprising aircraft, command centres, radar, observers, anti-aircraft guns, barrage-balloons and air-raid shelters already existed in the UK, much of it having been constructed before the Second World War commenced, tactics had to be extemporized to cope with the novel threat posed by the fast, low-flying V-1 'Doodle-bugs', which were quite vulnerable to fire but difficult to spot. By contrast, against the supersonic V-2, the parabolic trajectory of which carried it beyond the atmosphere before it hurtled Earthwards, no active defence was to hand for the immediate protection of targets; counterforce operations, notably air attacks on either the facilities where the missiles were produced and stored or on the rockets themselves, or the overrunning and occupation of their launch-sites, were the only options open to the UK's defenders.

Hitler's V-1s and V-2s indubitably caused appreciable disquiet among the communities they overshadowed. At a juncture when the Allies had finally appeared to be winning the Second World War, these crude rockets gave Germany the capability to mount random, insidious attacks by night or day. Around a third of all the V-1s launched penetrated the UK's defences, while the supersonic V-2 struck with utter impunity.¹ Nevertheless, these *Vergeltungswaffen* - 'retaliation weapons' - were never likely to prove much more than a localized nuisance, not only because of the defence's effectiveness but also because of their primitive design (which made them ineluctably indiscriminate) and, above all, the Nazis' failure to subordinate their employment to a viable political and military strategy. In their attacks on the UK, the Germans' increasingly desperate search for an Achilles' heel in the form of, first, the RAF's airfields during the Battle of Britain and, subsequently, population centres during the Blitz and the V-weapons campaign, underscored the inherent problems in trying to deal an opponent a knockout blow with conventionally-armed airpower alone. As a result, the V-weapons proved comparatively ineffective, killing less than 8,900 people between them - about 20% of the deaths inflicted by manned bombers in the Blitz as a whole.² It was never probable that this essentially aimless and comparatively insignificant destruction would cow the hitherto indomitable British. Indeed, the very name *Vergeltungswaffen* suggests that the Germans themselves regarded them more as instruments of denial than of coercion. Certainly, they did not engender terror

to the extent that Hitler had hoped they would. If only by means of the simple expedient of suppressing reports on the bombardment's scale and the casualties it inflicted, the British authorities prevented any widespread panic.³ In the meantime, Allied counterforce operations steadily eradicated the threat posed by these armaments to the UK.

Unlike so many in Britain, not least because of their geostrategic location and local air and naval supremacy, the cities and towns of the continental USA emerged from the Second World War virtually unscathed. Within a few years, however, the protection afforded America by her relative remoteness and great military power was being undermined. The launch, in 1957, by the USSR of the satellite *Sputnik*, the Cuban Missile Crisis of 1962 and China's acquisition of nuclear weapons shortly after helped spawn the first debate in the USA about BMD. Confronted with Congressional demands for a suitable shield and the initial reluctance of the Soviet Union to commit herself to bilateral negotiations over strategic arsenals, the Defense Secretary of the time, Robert McNamara, grew fearful that the USA would be left with no option other than to try to construct a national anti-ballistic missile (ABM) network. This threatened to be hugely expensive and, moreover, there were concerns as to the impact such a development would have on the Nuclear Non-Proliferation Treaty negotiations. Furthermore, likened to hitting one bullet with another, active BMD seemed as technically challenging as it did financially prohibitive. What had often been a bitter argument eventually ended in a compromise, whereby McNamara, persuaded that the most dependable and, thus, cost-effective way of countering any Soviet defensive web was to build more and better *offensive* missiles, focussed on just that, subordinating active BMD to deterrence.⁴ Announced in September, 1967, this decision was echoed by NATO's Nuclear Planning Group the following year, when it rejected the suggestion that a European missile shield should be devised.⁵ In the interim, the Russians' deliberations about ABM defences had proceeded in essentially the same direction of those of the Americans.⁶ Indeed, anxious to preserve the status quo, notably the mutually assured deterrence upon which the stability of the bipolar international system that they dominated was ultimately founded, both superpowers were in the end content to accept both the ABM Treaty and the Strategic Arms Limitation Treaty (SALT) of 1972, whereby they rather pompously pledged not to do what neither of them had any real desire to do anyway. There can be no question that the costs of the projected ABM defence networks outweighed any advantages that might have stemmed from having them, while SALT 1 left both sides with the liberty and resources to refine and expand their nuclear arsenals in a more selective fashion, notably through the procurement of survivable second-strike systems.⁷

The ABM Treaty was destined to survive for thirty years. The Americans' *Safeguard* BMD system, which was built to protect *Minuteman* missile silos from pre-emptive attack, remained in service from 1969 until 1975. The A-135, a modified two-tier system of the old Soviet *Galosh* BMD network, which was designed to protect Moscow and its environs, is still in being. In short, both superpowers used the very limited scope for BMD left them under the ABM Treaty to reinforce deterrence. Indeed, as early as 1946, one of the USA's most promising military thinkers, Bernard Brodie (1910-1978), who is perhaps best remembered for his book *Strategy in*

the Missile Age (1959), a staunch endorsement of the acquirement of survivable second-strike capabilities, had written: 'Thus far, the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them.'⁸

Yet sooner or later there were bound to be those who were dissatisfied with 'the balance of terror.' In 1983, with the deployment of sophisticated intermediate range missiles in Europe exacerbating East-West tensions, US President Ronald Reagan proposed an alternative security arrangement, the Strategic Defense Initiative (often pejoratively referred to as 'Star Wars'), which, critics argued, undermined deterrence by compromising the effectiveness of the Soviet strategic forces through the development and deployment of unparalleled BMD capabilities, many of which would be aboard platforms based in space. There were soon calls for a European Defence Initiative, too, with commensurately more modest suggestions for the enhancement of NATO's existing air-defences so that they would be able to counter aerodynamic and 'theatre' ballistic missiles.⁹

Neither the Strategic Defense Initiative, as it was originally envisaged by Reagan, or the European Defence Initiative ever came to fruition. Nevertheless, many of the operational concepts and technological innovations these ideas inspired survived the Cold War's end. The 'balance of terror' had, in the meantime, steadily become rather more complicated. Notwithstanding the 1968 Non-Proliferation Treaty, other states aspired to join the nuclear club and many sought and acquired other WMD, notably chemical and biological armaments. In recent years, apprehension in this regard over, firstly, Iraq and, subsequently, Iran has been to the fore, but the atomic test conducted by the People's Republic of China in 1964 was an alarming development for both superpowers. In fact, the USA considered mounting a preventive attack on the Chinese research and development facilities, while, within five years, observers were speculating that the USSR was facing her last opportunity to destroy Beijing's nuclear capabilities without incurring unaffordable costs herself. Having initially hoped to control China's acquisition of nuclear arms through the Test Ban Treaty and through cooperation with the USA, the Russians were eventually reduced to contemplating a preventive attack against the Chinese nuclear plant at Lop Nor in 1969.¹⁰ This drastic option was eventually rejected, leaving the Kremlin worrying about a growing and increasingly sophisticated Chinese arsenal, including nuclear weaponry, along the Sino-Soviet frontier. Amidst the deepening rapprochement between China and the USA that was coincident with and influenced by the end of the Vietnam War, the Russians became ever more fearful that Beijing might get its hands on Western aerospace technology that might weaken the USSR's strategic position still further.¹¹

There are obvious pitfalls surrounding preventive strikes, namely those attacks intended to stop the acquisition of a particular capability. Nevertheless, these have been resorted to on occasion, notably the Israelis' destruction of the Iraqi nuclear facility at Osirak in 1981¹² and Operation 'Desert Fox' in 1998, whereby British and American air power razed buildings in Iraq that were thought to be being used for the clandestine production of WMD. Indeed, the

invasion of Iraq five years later was arguably the grandest preventive operation ever mounted. In view of the enormous difficulties involved in intercepting a missile once it is in flight, the temptation to try to avoid the need for this through either preventive or pre-emptive attacks is considerable. However, it is only to be anticipated that future counterforce operations will encounter greater endeavours to thwart them. This could be achieved by various deception techniques, by enhancing the defences, concealment or mobility of possible targets, by dispersing them or by granting them greater operational independence. In any event, not only do pre-emptive blows call for an intelligence-gathering and dissemination mechanism that is almost infallible, they also constitute a questionable policy, from both a legal and moral standpoint, that can all too easily prove counterproductive as well.¹³ What exactly is to be pre-empted and what is expected to ensue? Can pre-emption be reconciled with the right to self-defence?

Such were and are the sheer size and sophistication of the Russians' missile inventory that, since Reagan's abortive SDI, no serious proposals for countering these forces through universal, active-defence measures have been given much thought (in public, at least!). Nevertheless, the attempts by NATO in general and the USA in particular to counter more-manageable threats have predictably aroused suspicions in Moscow and Beijing alike. With the end of the Cold War, the rationale for missile-defence altered: tactical protection for deployed forces was increasingly seen as essential; some capacity for destroying missiles launched in error or by accident was regarded as desirable; the insidious danger that non-state actors, who would not be susceptible to deterrence, might acquire WMD and some means for delivering them remotely was also seen to be growing; and there was a clutch of 'rogue' states - North Korea, Iran, Libya and Iraq - that appeared bent on upsetting the apple-cart by obtaining WMD and missile-technology through fair means or foul. The response of George W. Bush's administration to these looming dangers included: the rescinding of the ABM Treaty; the invasion and occupation of Iraq in 2003; the rather hasty development and deployment of ground-based interceptors (GBI) at Fort Greely, Alaska, and Vandenberg Air Force Base, California; and plans for an array of ten such interceptors at Koszalin, Poland, which would be supported by a single, large, static radar in the Brdy district of the Czech Republic.

In fact, the justification for some Western capacity for active missile-defence began to change before the Cold War's end. Even as the threat from the crumbling Soviet Union receded, new dangers were looming on the horizon. The bombardment of Israeli and Saudi cities by Iraqi ballistic missiles during the Gulf War of 1991 seemed a harbinger of things to come. The immediate reaction to these developments included extensive counterforce operations - the so-called 'great Scud Hunt' - and the hasty deployment of American *Patriot* (PAC-2) air-defence units to give some protection to vulnerable nodes. (The *Patriot* had essentially been designed as an anti-aircraft weapon and had to be rushed from testing into emergency production.) Although, at the time, great claims were made about its performance in countering the Scuds, subsequent analysis suggested that very few, if any, incoming rockets were successfully intercepted.¹⁴ Re-entering the Earth's atmosphere had evidently proved a greater danger to

the *Al-Hussein* variant especially than had active defence measures such as the *Patriot*, which, among other problems, had difficulty distinguishing between the warhead and other larger pieces of debris from disintegrating missiles.

Although the damage inflicted by the Scuds was far more psychological than physical, it did have considerable effect, not least within some of the USA's political and military circles. Whereas, largely because of the high degree of control of the air enjoyed by her armed forces during the intervening period, the USA had not lost a single soldier to aerial attack for almost 40 years,¹⁵ during the Gulf War 28 perished and 97 were injured in a single incident when, as much by accident as design, one of Saddam Hussein's rickety missiles fell on their barracks in Dhahran.¹⁶

This spurred on America's quest for effective, active defences against missiles. Developing and deploying suitable armaments as quickly as possible was seen as an imperative. Not least because the US Army, Air Force and Navy were all searching for their own solution to perceived problems, a number of potential weapon systems was invested in, notably the Theatre High-Altitude Area-Defence (THAAD) interceptor, improved versions of the existing *Patriot*, the ship-mounted SM-3 Missile, which was linked to the Aegis radar system, and the exotic Airborne laser, which was squeezed into a Boeing airliner. There were also multi-national collaborative ventures, such as the Israeli missile-defence project, which was to yield such weapons as the *Arrow*, *David's Sling* and *Iron Dome*, and the European Medium Extended Air-Defence System (MEADS).

These undertakings relied - and, in some cases, still rely - extensively on American financial subsidies, technology-transfers and expertise. The monetary costs alone attached to missile defence have proved, and continue to prove, awesome. Although the Clinton administration was to spend some \$25 billion on BMD alone during the fiscal years 1997-2003, this sum was to prove insufficient at times. The USA's annual spending on projects relating to missile defence has averaged almost 2% of the overall defence budget since 2001 and will amount to \$9.9 billion in the financial year 2011. It is expected to rise to \$10.7 billion in the year after.¹⁷

Moreover, the new emphasis on active defence has proved irreconcilable with parts of the existing framework of arms-control agreements. The USA duly withdrew from the ABM Treaty in 2002.¹⁸ Faith in the Missile-Technology Control Regime (MTCR) also waned. The MTCR was the next best thing to an international treaty banning trade in missiles and their key components; it sought to dovetail export controls among its numerous members so as to prevent militarily-sensitive technology, materials and know-how from being passed to certain states. In the porous societies of today's world, this approach was unlikely to prevent those bent on acquiring particular capabilities from doing so. Diplomatic efforts to constrain the spread of WMD continue, but there is now an open market in many technologies associated with the cardinal delivery system for such weapons, the missile.

In the meantime, in the face of a threat that is seen to be increasing, both qualitatively and

quantitatively, America's current government 'will continue to reject any negotiated restraints on U.S. ballistic missile defenses.'¹⁹ Many states that already possess missiles are enlarging their inventories; others are deploying missiles that are more sophisticated than their predecessors. The range and accuracy of ballistic missiles is generally improving, bringing ever larger areas of the Earth's surface within their reach and rendering these armaments that much more capable of striking discrete targets. Pre-launch survivability might well increase as potential adversaries strengthen their deception measures and increasingly rely upon mobile, rather than static, platforms. Many states are now using advanced, liquid- or even solid-propellants in their missiles, which reduces launch-times and improves both reliability and the scope for mobility. This, in turn, enhances survivability. Besides attempting to increase their missile units' protection against counterforce operations of the type seen in the 'Great Scud Hunt', some states are also trying to develop technical and operational countermeasures to neutralize active missile-defences, not least the technique of firing salvoes of missiles so as to swamp the monitoring capabilities and firepower of any defensive network.

Moreover, whereas a few states are also believed to be bent on developing nuclear warheads for their ballistic missiles, rather more are seen to be devising chemical or biological payloads, or both. North Korea, for instance, has not disguised her nuclear ambitions and has been endeavouring to perfect a long-range rocket that might deliver such a warhead.²⁰ The *Taepodong-1* missile, which first appeared in 1998, has now been joined by the *Taepodong-2*, a variant of which, it is believed, might eventually be capable of reaching parts of the continental USA. Test launches of the *Taepodong-2* have been dogged by failure, but the same could be said of the development of many other, ultimately serviceable, ballistic missiles. As the proliferation of nuclear arms has itself highlighted, if sufficient resources, including time, are devoted to their solution, even complex technical problems can very often be overcome. It would be imprudent not to assume that, unless there is a substantial change in the course of North Korea's national security strategy, she will possess a viable ICBM by 2020.

In the meantime, countries that are important allies of the West in general and of the USA in particular - some of them, such as South Korea, containing a significant American military presence - are already in reach of North Korean ballistic missiles. Likewise, the exposure of Taiwanese military and civilian centres, not to mention US and allied forces in the region, to attack by ever more numerous and sophisticated Chinese ballistic missiles based along the straits represents 'a growing imbalance of power' that 'particularly concerns' the USA.²¹ (China even claims to have successfully tested her own ground-based BMD system in January, 2010.²²) Similarly, Iran, suspected of clandestinely developing nuclear weaponry, is certainly acquiring ballistic missiles of greater reach than those she has had in the past, while Syria is known to have several hundred Scuds and SS-21 short-range ballistic missiles, all of which are mobile systems. It is believed that Syria also has at least some chemical warheads for use with her Scuds.²³ Cyprus - where Britain has sovereign bases - and much of Turkey, Israel and Iraq can be reached by such missiles, whereas the latest variant of Iran's *Shahab-3* is thought to have a range of all of 2,000 kilometres.²⁴ Most of the Balkan Peninsula, which, since the Gulf War of

1991, has become NATO territory, thereby lies within striking distance. Iran's ally, Hezbollah, which has made ever more use of rocket systems of various types, is widely believed to have amassed some 40,000 such devices, mostly short-range armaments, with which to saturate Israel's defences.²⁵ As a recent American report on BMD concluded: 'Such capabilities could be significant sources of military advantage during a conflict. But they may be equally significant in times of relative peace, when they undergird efforts to coerce states near and far.'²⁶

Ever since the mid-1990s, NATO has proceeded on the assumption that, within fifteen years, much of the alliance's territory would lie within reach of, not just weaponry possessed by the old adversary, Russia, but also ballistic missiles belonging to potentially hostile states such as Iran. This expectation has partly been fulfilled. Indeed, during the second quinquennium of the 21st Century, growth in the capabilities of North Korea and Iran provoked considerable anxiety in the West, not least in Washington, where fears of a missile attack on the continental USA intensified. On coming into office, President Obama ordered a thorough review of the policy and plans regarding BMD that had been pursued by the preceding administration under President George Bush. Published early in 2010, the resulting report concluded that, thanks to measures that had already been implemented, the USA possessed sufficient capability 'to counter the projected threat from North Korea and Iran for the foreseeable future.'²⁷ It was therefore proposed that, for the time being, no new ground-based interceptors be added to those that had already been deployed in California and Alaska. Aided by early-warning radars in the UK, Greenland and the continental USA, and by radars mounted on anchored rigs and aboard Aegis cruisers and destroyers, these interceptors might undergo some qualitative refinements, but their number could, it was believed, safely be left at thirty.²⁸ Moreover, the plans for the deployment of interceptors and a supporting, static radar in Eastern Europe – plans that, predictably, had antagonised the Russians – were likewise discarded.

The challenge had not quite taken on the pace, size and shape that had been expected, underlining the need for a more flexible, adaptive approach to the quandary of BMD than that taken by the Bush administration. Nevertheless, substantial and expanding dangers abounded. As Robert Gates, the US Secretary of Defense, observed at the beginning of 2010:

*'The protection of the United States from the threat of ballistic missile attack is a critical national security priority. The threat to our deployed military forces and to our allies and partners is growing rapidly. This threat has significant implications for our ability to project power abroad, to prevent and deter future conflicts, and to prevail should deterrence fail.'*²⁹

Rather than trying to neutralize this threat through an integrated missile-defence architecture that integrates allies into a uniform, global structure, the USA was henceforth to pursue 'regional structures sharing common assets that are relevant and robust because they are tailored to the unique requirements and opportunities within each region.'³⁰ In the case of the NATO area, a 'phased, adaptive approach' was envisaged, whereby, focussing on real, emerging threats and relying on tried and tested solutions, successively better, interoperable and more

numerous capabilities would be deployed in four phases that would stretch as far into the future as 2020. Protection from attack by ballistic missiles would thereby gradually be extended to cover, not just deployed forces, but also entire countries and populations.

The first of these phases has already begun. Aegis cruisers, armed with SM-3 (Block 1A) interceptors and deployed on six-month tours in European waters, will supplement European and American *Patriot* PAC-3 batteries and long-range sensors such as the AN/TPY-2 high-resolution radar (Army and Navy Transportable Radar Surveillance System). The North Atlantic Council is finalizing appropriate missile-defence consultation and control arrangements. During the programme's second phase, a more capable version of the SM-3 (the Block 1-B) will be introduced, together with better sensors so as to expand the defensive 'envelope' against short- and medium-range missiles. Likewise, the *Patriot* Missile Segment Enhancement (PAC-3 MSE) programme will yield an interceptor that is faster and more agile than its predecessors. (This will also serve as the interceptor component in the MEADS.) A re-locatable land version of the SM-3, provisionally dubbed 'Aegis ashore', is also being perfected to complement THAAD and *Patriot* batteries from 2015 onwards. Still more capable versions of the SM-3, the Block 2-A and Block 2-B, are envisaged and are expected to enter service in phases three and four, respectively.³¹

Prior to this, the depth of NATO's defences will be bolstered through the introduction of a fleet of RPAS, which will use infrared sensors to detect and track multiple targets. The ability to cue the SM-3 through remote sensor data is also being explored. This will effectively expand the missile's reach by enabling the interceptor to engage targets beyond the range of the Aegis radar. Similarly, it is expected that, between 2015 and 2020, new space-based sensors will be deployed that will be capable of detecting and tracking numerous missiles throughout their flight. This might permit a reduction in the need for terrestrial sensors and in the overall size of defensive networks.³²

From the preceding, brief survey of the history of missile defence, it can be seen that there are four potential solutions to the fundamental problem. These comprise deterrence and, should that fail, a triad of defensive measures: counterforce, passive defence (which includes arms-control) and active defence.

The performance characteristics of ballistic missiles, aerodynamic missiles, RPAS and crewed aircraft all differ to a greater or lesser degree, necessitating a blend of contrasting defensive systems in any extended air-defence network. However, identifying and achieving the appropriate mixture of the various defensive components in a dynamic, scenario-dependant environment is all but impossible. Military capabilities take years to develop or regenerate once lost, yet political intentions can alter literally overnight. Furthermore, not only do force-balance issues affect each component of the defensive triad, complicating research and procurement decisions as well as operational matters, but also the elements of extended air-defence are as mutually competitive as they are reinforcing.

This exacerbates force-design and strategic-planning difficulties. For example, if arms-control or efficacious counterforce capabilities might reduce if not obviate the need for active defence preparations, then powerful counterforce or active defence capabilities could diminish the requirement for passive defences. Providing an appropriate level of active and passive protection for anything but deployed forces, however, would be dauntingly costly. Just as pure defence could not offer complete protection - furnishing passive defences for entire countries is essentially impracticable and would offer only scanty protection against WMD - so too could active defences be circumvented by unconventional delivery means, including acts of terrorism involving WMD.³³ Under the phased, adaptive approach to extended air-defence, threats are to be addressed in a prioritised fashion that includes consideration of the imminence of the danger and the level of acceptable risk. This approach is, of course, largely guesswork, but it would appear to be the best solution available to the conundrum.

Besides such broader complexities, there are several dilemmas surrounding the tactical operation of missile-defences. Where BMD is concerned, providing one has suitable sensors, decision-making processes and interceptors, it is theoretically possible to strike at a ballistic missile during the boost, mid-course and terminal phases of its trajectory. There are disadvantages and advantages that are peculiar to each of these approaches, necessitating the customizing of defences to each particular set of circumstances. During its boost phase, for example, any missile will present a single target; it will not yet have deployed either any decoys it possesses or, if fitted with more than one payload, its discrete warheads, of which there might be several. Debris from any successful interception will, moreover, fall onto the launch area. On the other hand, an ICBM typically reaches a speed of seven kilometres per second within 250 seconds of being launched. This leaves an opponent very little time - five minutes at most - in which to detect the launch, plot an interception and unleash an interceptor. The latter missile will then have to cover the intervening distance with tremendous speed if the target is not to evade it. All of this demands early detection, which requires good sensors (not least satellite-based systems), ideally of contrasting types, and very rapid decision-making mechanisms.

The mid-course phase of a missile's flight, by contrast, offers a relatively large window of opportunity for interceptions, perhaps as much as twenty-five minutes. During this period, various sensors, such as radars and space-based tracking systems, can guide ground-based interceptors to the target. However, there is now a chance that their quarry will be obscured by decoys, such as balloons made from polyethylene terephthalate. Whereas the more adept sensors can discriminate between these and real warheads, decoys are steadily becoming more sophisticated.

Finally, an interception might be attempted during the terminal, re-entry phase of a missile's flight. This period might last no more than a minute, leaving the defender with very little time in which to use his firepower. Protective systems thus have to be situated in the vicinity of the target and need to be able to track and intercept incoming missiles with extraordinary precision. Decoys are unlikely to complicate matters at this stage, since they usually burn up

on entering the Earth's atmosphere. Any debris from intercepted missiles will of course fall onto the target area and might thereby inflict some damage.

Last but by no means least are the difficulties inherent in achieving an interception. Likened to hitting one bullet with another, BMD calls for extraordinary precision; a split second or an angle of a fraction of a degree can make all the difference between success and failure. Rather than employing proximity fuses, interceptors such as *Patriot* (PAC-3), THAAD and the SM-3 ultimately depend upon 'kinetic kills', whereby a collision between the incoming missile and defensive projectiles, the final trajectory of which is adjusted by sophisticated, organic sensors and guidance systems, is engineered. BMD is thus essentially a sequential process; if a single link in the chain fails, then the chain as a whole is compromised. During its development, the THAAD missile, for instance, once failed five consecutive tests for five different reasons, while, as recently as December, 2010, a GBI, which was launched from California and guided by a sea-based X-band radar, failed to destroy a target missile fired from the Marshall Islands; the exo-atmospheric kill-vehicle released by the GBI rocket did not find its prey.

That said, many years of investment, testing and refinement have begun to pay dividends. Indeed, better, more cost-effective technology is one of the considerations that have helped bring about the change in American policy that has occurred of late. These exotic weapons are more dependable than ever before. Whereas in the past the perceived urgency of the situation led to some development and deployment programmes occurring simultaneously, the US government's approach is now one of 'fly before you buy.'

Whether tried and tested BMD armaments and supporting sensors can be produced and afforded in sufficient quantities to satisfy the growing demand for them remains to be seen. And this is just one of several overlapping complexities concerning the density of any defensive network alone. For instance, confronted with the possibility that, as occurred in 2006, hundreds of short-range rockets might be fired into her territory by Hezbollah, Israel, with American assistance, is investing in *Iron Dome* batteries. Each of these has radars capable of tracking several targets simultaneously and twenty interceptors. Will this firepower prove sufficient to deal with the potential volume of incoming projectiles? If not, on what are these defensive assets to be focussed? It is becoming increasingly clear that the priority is to protect military capabilities, not least counterforce capabilities, rather than, say, population centres.

Several quandaries bedevil the USA's latest policy regarding missile defence. Among these are: the need to find sufficient funds to pay for capabilities over the long term; to ensure that new technology is proven before deployment; to protect the homeland while finding sufficient resources to defend against regional missile threats to US forces as well as, where appropriate, their allies and partners; to make certain that capabilities are sufficiently flexible to adapt as threats change; and to achieve expanded international cooperation over missile defence while not jeopardizing the strategic balance between the world's major powers, notably NATO, Russia and China. As far as regional BMD is concerned, there is a further need to customize

capabilities to meet the peculiar deterrence and defence requirements of each theatre, the characteristics of which vary appreciably in terms of geography, the scale of the perceived threat and its rate of growth, and the breadth and depth of the relationship between the USA's armed forces and the 'host' military. As the potential, global demand for missile-defence assets might well exceed supply, it is also felt necessary to develop systems that are mobile and can be relocated to counter shifting and evolving threats.

According to *The Ballistic Missile Defence Review Report* of 2010, the USA 'seeks to create an environment in which 'the development, acquisition, deployment and use of ballistic missiles by regional adversaries can be deterred, principally by eliminating their confidence in the effectiveness of such attacks.'³⁴ Much of the disquiet aroused in recent years in the USA in particular and in the West in general by ballistic missiles has stemmed from events in Iran. To date, diplomatic sanctions and deterrence have been to the fore in trying to deal with what could all too easily become one of the greatest political and military dilemmas of our time. It is clear that faith in the eventual success of these endeavours is faltering and more emphasis is being placed on preparations for active BMD by NATO, Israel and several members of the Gulf Cooperation Council that have bilateral arrangements with the USA.³⁵ Whilst a greater capacity for active defence might bolster deterrence, it will be interesting to see what role, if any, the other components of the defensive triad are allotted in the ultimate resolution of this quandary.

Notes

¹ Whereas 1,054 V-2s struck Britain, about 10,000 V-1s were unleashed against her, mostly from surface sites, though a few were launched from aircraft. In all, 7,488 reached Britain, 3,531 eluding the defences. See: I.C.B. Dear and M.R.D. Foot, *The Oxford Companion to the Second World War* (Oxford, 1995), pp. 1,249-53.

² See: *ibid.* pp. 138-40; B. Ford, *German Secret Weapons: Blueprint for Mars* (London, 1970), pp. 104-11; and B. Collier, *The Defence of the United Kingdom* (London, 1957), pp. 527-8.

³ R.V. Jones, *Most Secret War* (London, 1978), pp. 523-75.

⁴ See: 'Arms Control and Disarmament', *Foreign Relations of the United States 1964-68* (Washington DC, 1997), 282-4, 286-8, 407-17, 421-23, 426-9, 499-502, 512-15, 653-7, 659-61, 669-72, 674-80, 704-13, 744-7 and *passim*.

⁵ M. Rühle, 'Preserving the Deterrent: A Missile Defence for Europe', *Occasional Paper 21* (Institute for European Defence and Strategic Studies, London, 1986), p. 7.

⁶ See C. Bluth, *Soviet Strategic Arms Policy Before SALT* (Cambridge, 1992), pp. 199-218.

⁷ See: C. Bluth, *op. cit.*, pp. 199-218; J.J. Stone, 'The Case Against Missile Defence', *Adelphi Paper 47* (International Institute for Strategic Studies, London, 1968); and J. Voas, 'Soviet Attitudes Towards Ballistic Missile Defence and the ABM Treaty', *Adelphi Paper 255* (International Institute for Strategic Studies, London, 1990).

⁸ B. Brodie (editor), *The Absolute Weapon* (New York, 1946), p. 76.

⁹ See: C. Bertram, 'Strategic Defence in Europe', *Nato's Sixteen Nations* 31/3, (June, 1986), 28-30;

D.L. Hafner and J. Roper, (editors), *ATBMs and Western Security: Missile Defenses For Europe* (Cambridge MA, 1988); D.S. Sorenson, 'Ballistic Missile Defence for Europe,' *Comparative Strategy*, 5/2 (1985), 159-78.

¹⁰ See: R. Foot, *The Practice of Power: US Relations With China Since 1949* (Oxford, 1995), pp. 128-9, 133, 176, 178-81, 188-93.

¹¹ C.J. Bartlett, *The Global Conflict* (London, 1994), pp. 349, 365-6; Foot, *op. cit.*, p. 138-9.

¹² For a survey of such attacks on nuclear facilities, see: S.E. Kreps and M. Fuhrmann, 'Attacking the Atom: Does Bombing Nuclear Facilities Affect Proliferation?' *Journal of Strategic Studies*, 34/2 (2011), 161-87.

¹³ See, for instance, S. Condron, 'Justification for Unilateral Action in Response to the Iraqi Threat: A Critical Analysis of Operation Desert Fox,' *Military Law Review*, 115 (1999).

¹⁴ See Activities of the House Committee on Government Operations, 'Performance of the Patriot,' *Congressional Record*, House of Representatives, 102nd Congress, 1st and 2nd sessions,, 1991-92 (Washington DC, 1992), pp. 179-85; T. Postol, 'Lessons of the Gulf War Experience with Patriot,' *International Security*, XVI/3 (1991) 119-71; T. Postol and R. Stein, 'Patriot Experience in the Gulf War,' *International Security* XVII/1 (1992), 199-240.

¹⁵ P.S. Meilinger, *Ten Propositions Regarding Air Power* (Washington, 1995), pp. 4-5.

¹⁶ These figures constituted 36% and 34% of all the US Army's fatalities and wounded, respectively.

¹⁷ See: W. Ferster, 'US Missile Defense Faces Funding Deficit,' *Defense News*, 13/19 (May, 1998), 3, 27; US Department of Defense, Office of the Assistant Secretary of Defense (Public Affairs), *News Release 084-10*, (Washington DC), 1 February, 2010; Office of the Under Secretary of Defense (Comptroller), US Department of Defense, *Fiscal Year 2012: Budget Request: Overview* (Washington DC, 2011), section 4-9.

¹⁸ There is also some concern for the future of the Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (1967), which calls for the peaceful use of space. Some ballistic missile interceptors can reach satellites in low -earth orbit. Will satellite constellations come to be protected by space-based defences, thereby militarizing space?

¹⁹ US Department of Defense, *Ballistic Missile Defence Review Report* (Hereafter *BMDRR*), (Washington DC, 2010), p. 34.

²⁰ International Institute for Strategic Studies, *The Military Balance 2011: The Annual Assessment of Global Military Capabilities and Defence Economics* (Hereafter *Military Balance 2011*), (London, 2011), pp.249-50.

²¹ *BMDRR*, p. 7.

²² *Ibid.*, pp. 12-13. For a broader survey of Chinese capabilities, see: *The Military Balance 2011*, pp. 230-36, particularly p. 230.

²³ See: *Military Balance 2011*, pp. 330-32.

²⁴ See: *Ibid.*, pp. 309-11.

²⁵ For a discussion of this and related problems, see S. Kainikara and R. Parkin, *Pathways to Victory: Observations from the 2006 Israel-Hezbollah Conflict* (Air Power Development Centre, Tuggeranong, 2007); and A. Stav (editor), *The Threat of Ballistic Missiles in the Middle East: Active Defense and Counter-Measures* (Brighton, 2004).

²⁶ *BMDRR*, p. iii.

²⁷ *Ibid.* p. iv.

²⁸ *Ibid.*, pp. 15-16.

²⁹ *Ibid.* p. i.

³⁰ *Ibid.*, p. 23.

³¹ *Ibid.* pp. 20-23.

³² *Ibid.* pp. v, 21.

³³ For some of the complexities surrounding this issue, see: A.J. Mauroni, 'A Counter-WMD Strategy for the Future,' *Parameters: US Army War College Quarterly*, XXXX/2 (2010), 58-73.

³⁴ *BMDRR*, p. vi.

³⁵ *Ibid.*, pp. 5-6, 33-34. Also see: International Institute for *Strategic Studies*, *Strategic Survey 2010: The Annual Review of World Affairs* (Abingdon, 2010), pp. 242-45.

The End of Air Power History and the Last Airman?: Air Power, Liberal Democracy and the British Way of War

By Group Captain John Alexander

This article seeks to add to the post-Cold War character of conflict debate by putting air power, its attractiveness to liberal democracies and the subsequent British way of war, in both conventional war and counter-insurgency, into historical context. The article starts with a synoptic examination of the utility of air power in what David Edgerton has called liberal militarism, enabling Britain to avoid bloody and expensive land conflict by using economic, technical and industrial superiority. The article then questions the notion that air power has limited utility in counter-insurgency by examining Britain's use of air power as part of a liberal militarist approach to counter-insurgency. The third section critically analyses the argument deployed before the SDSR that unitary, land-centric conflict would predominate and therefore Britain's armed forces needed rebalancing. The article concludes by contending the intervention in Libya is an example of liberal militarism and continuation of the British way of war. The article's conclusion is that air power remains fundamental to the British way of war in post-Cold War conflict, as it has since the First World War.

Introduction

In his seminal essay of 1989, the American philosopher Francis Fukuyama argued the end of the Cold War, and liberal democracy's defeat of fascism and communism, marked the 'the end point of mankind's ideological evolution'.¹ Fukuyama's thesis was challenged most famously by Samuel Huntington's *The Clash of Civilisations* for failing to take into account the challenges of extreme nationalism and religious fundamentalism.² The impact of the end of the Cold War on the character of conflict has also been the subject of much debate.³ In his introduction to the British government's October 2010 Strategic Security and Defence Review (SDSR), the prime minister stated a 'Cold War mind-set' had resulted in forces ill-equipped to 'fight modern wars'.⁴ The purpose of the SDSR, according to General Sir Nick Houghton, the Vice Chief of Defence Staff, was to reshape the 'utility of defence to the strategic context' against a background of acute government debt, the absence of an existential threat, and a political nervousness about the use of the military instrument following the experience of Iraq and Afghanistan, and, of course operations in Afghanistan and a black hole in the Defence budget.⁵

In these difficult circumstances, Britain's post-SDSR forces were to be shaped for stabilisation operations. The army would retain five multi-role brigades to enable a brigade-sized enduring stabilisation operation, but only enough combat air to support would be retained to support two of the five deployments.⁶ Similar risk was to be taken in carrier strike and maritime-patrol capabilities. The relative prioritisation of the army over the RN and RAF represented a marked change in British defence strategy. A rough measure of the disproportionate cuts to the RAF is its relative reduction in strength from forty per cent of the army's in 2010 to thirty four per cent by 2015. Thus, as a proportion of the army, the RAF's strength had more than halved since the height of the Cold War in 1951 when it was seventy per cent.⁷ Throughout the Cold War the RAF's relative strength was around sixty per cent of the army's, and from 1993 it reduced gradually to forty-five per cent in 2005. While the Arab Spring appears to prove Fukuyama's thesis that the desire to live in a modern, technologically advanced and prosperous society is universal, the outcome of the Libyan intervention is as yet unknown. But thus far it has been a reminder of the utility of air power in an age of uncertainty, with the RN and RAF using apparent Cold War legacies destined for reduction or deletion following the SDSR: the Type 22 frigates, Nimrod R1, Sentinel R1 and Tornado GR4, causing Paul Cornish to recently suggest the SDSR may be one of the fastest failures in 'modern strategic history'.⁸

There is a growing body of work on recent British defence strategy and the SDSR. Much of it has focused on the lack of leadership, strategy and coherence. Anthony King recently highlighted the failure of British political and senior military leadership to articulate a strategy linking ends, ways and means.⁹ Paul Cornish and Andrew Dorman attribute this to 'campaign tribalism'; where pressure on the defence budget has led to unprecedented inter-service rivalry.¹⁰ Timothy Edmunds has characterised the key inter-service difference as power-projection verses stabilisation. Edmunds thinks the two are interrelated as the latter often follows the former.¹¹ Anthony King notes the army in the SDSR won a 'Pyrrhic victory on the

basis of its geographically tiny campaign in southern Afghanistan' but at the cost of a navy and air force of sufficient size and capability to deploy and sustain it.¹²

According to General Houghton, the question as to whether the character of conflict had changed was central; indeed he described the MOD's own *Future Character of Conflict* study as the intellectual underpinning of the SDSR.¹³ The idea that conflict evolves is not new. Fukuyama took the phrase 'end of history' from Hegel, the German historicist philosopher who saw human history as a coherent, evolutionary process of human understanding. Hegel used 'end of history' to describe the impact of revolutionary France's defeat of Prussia at Jena in 1806. Another German, writing at the same time as Hegel and using the same dialectic method of argument, thought Napoleon's use of conscripted, mass armies to win battles of annihilation represented an idealist notion of unlimited war - a revolution in military affairs. His subsequent study of Napoleon's defeat at Waterloo led Clausewitz to develop the idea of limited war as an extension of politics.¹⁴ In the period leading up to the SDSR, Clausewitz's notion of the unchanging nature of war was widely used to critique the hubris of the information-age revolution in military affairs, and the neo-conservative belief that the US could define war in its own terms and impose democracy using shock and awe. The rapidly changing character of conflict in Iraq and Afghanistan, it was argued, demonstrated these post-Cold War enemies were adapting to the western way of warfare, and reducing the effectiveness of its defining element – air power.¹⁵

This article examines why successive British governments since the First World War regarded air power as central to the British way of war. It then examines the arguments used leading up to the SDSR that changes in the character of conflict made Britain's relative prioritisation of air power outmoded. The article contends that the notion of air power having limited utility in counter-insurgency is ahistorical and furthermore the idea that Afghanistan heralds the character of all conflict for British forces in 'the post-Cold War world' is flawed.

Air Force Elitism

Britain's relative prioritisation of air power in the twentieth century was a continuation of the British way of warfare, based on maritime, economic, industrial and technical strength, and what Basil Liddell Hart called an indirect approach.¹⁶ In the eighteenth century, the transformation of the English economy by naval warfare and taxes had created a great power without loss of liberty at home. Articulating the requirements of imperial defence in the nineteenth century, machine age, Sir Colomb had described the navy as the 'shield' and the army the 'spear'.¹⁷ Likewise, Paul Kennedy subsequently described imperial maritime strategy as a defensive strategy: Britain could afford long wars and an indirect approach because of its industrial strength, whereas decisive victory against a European enemy required a bloody continental land campaign, preferably using an ally's army.¹⁸ In the twentieth century Britain's war machine was built, as David Edgerton has written, on weapons, resources and boffins, not on manpower, and the aeroplane had a special place.¹⁹ The nexus of Britain's imperial strategy

and continental war occurred in 1917 and again in 1940, when an enemy air force was within striking range in Europe.²⁰

During the First World War Britain's organisation and use of air power was like that of other nations - navy and army air services supporting their parent services - until they proved powerless to stop two German Gotha bomber daylight formation raids on London in June and July 1917. Britain's particular fear of the bomber in fact predated the First World War, when many novelists, including H G Wells, and newspapers such as the Daily Mail, foresaw the bomber as the new battleship, threatening British strategic invulnerability, and the panic caused by the bombing of cities.²¹ The War Cabinet's response to the air raids, which killed and wounded six hundred people and threatened war production through absenteeism, was to appoint a two-man committee - the prime minister, Lloyd George, and the South African general Jan Smuts - to examine air defence and the organisation of the air services.²² Smuts's first report on air defence eight days later established the key principle of unified command of the air defences.²³ By August the reorganised air defences had forced the Gothas to operate by night and by May 1918 the raids had stopped. In August 1917 the cabinet accepted the recommendation of the second report to form a separate Air Ministry and a new air service to be responsible for all military aircraft. The report predicted a revolution in military affairs:

*The day may not be far off when the aerial operations with their devastation of enemy land and the destruction of industrial and populous centres on a vast scale may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate.*²⁴

The navy and army objected to the decision, thinking it threatened their air support.²⁵ Field Marshal Haig, a firm proponent of air power for army support, thought the new air service's strategic role a flawed distraction.²⁶ Air power had become vital to what Jonathon Bailey has called the modern system of warfare.²⁷ Whereas the 1914 battlefield would have been familiar to Clausewitz, by 1918 the use of combined arms on the battlefield - key to which was indirect artillery fire - had caused a revolution in military affairs and would be familiar now. German possession of key terrain meant the British on the Western Front were particularly dependent on the Royal Flying Corps for aerial observation and therefore control of the air. Other air power roles as such as interdiction and the close support of tanks were growing in importance on the Western Front, but not yet essential to battlefield success.²⁸ The exception perhaps was the RAF's destruction of a routed Turkish army on the battlefield at Megiddo was a harbinger of Falaise in 1944 and the Basra Road in 1991.²⁹

The government's interwar policy of prioritising strategic air power was a combination of the indirect approach, and political and public fear of a 'knock-out blow' from the air. The RAF's institutional need to protect its independence encouraged its advocacy of strategic air power; inviting a literary scholar to write the history of *The War in the Air*. Thus despite the so-called Ten-year Rule which assumed no great war for ten years, the British government quickly realised

the strategic importance of matching enemy air forces – deciding in 1923 to create a home defence air force of fifty-two bomber and fighter squadrons, an air equivalent to the navy's one-power standard.³⁰ As a result the UK maintained the world's largest strategic air force between 1925 and 1935. The Defence Requirements Committee in 1934 recognised Germany as the foremost long-term threat to Britain and directly led to the government prioritising air rearmament. Subsequently the Chamberlain government's Inskip doctrine of December 1937 prioritised air defence over bombers and all other rearmament in order to prevent the 'knock-out blow' and allow Britain to fight a long war using its war economy, which by 1939-1940 was out producing Germany's.³¹ Revisionist historians of the appeasement controversy now argue that Chamberlain's wholly defensive military policy made poor use of Britain's relative strength and failed to defend ally France or deter Hitler.³²

These interwar policies greatly shaped Britain's war machine, and its subsequent strategy in the Second World War.³³ There was no German 'knock-out blow' as the German air force's role was army support. The last-minute British decision in February 1939 to send an expeditionary force to France meant it was ill-prepared for combined arms warfare.³⁴ The allied loss of control of the air, notwithstanding significant losses on both sides, contributed greatly to the unexpected fall of France. The War Office committee investigating the defeat recommended an army air corps equipped with dive bombers and until it was formed the RAF should support the British Army at the expense of other tasks.³⁵ Fighter Command then won the battle it had been established to fight. The Inskip doctrine had directed Bomber Command be ready in 1942, and before then it was ineffective.³⁶ Though the strategic bomber offensive has been criticised as being futile, for example by Max Hastings's *Bomber Command*,³⁷ economic historians have shown its vital impact distorting German strategy and economic capability. By mid-1943, the bombing campaign had forced the Luftwaffe to focus almost entirely on air defence, destroyed at least thirty per cent of industrial production, interrupted Germany's raw materials and energy resources, and forced it to divert resources into wonder weapons such as the V-bombs.³⁸ However the contested ethics of the campaign, which Clausewitz would have recognised as unlimited war, still resonate today.

By 1943 the provision of air support was of central importance to the British Army, after a bitter dispute between the army and the RAF had been resolved.³⁹ John Buckley counters Max Hastings's criticism of the stickiness of the British Army in Normandy by arguing that its doctrine was to use overwhelming materiel, including artillery, close air support and, if necessary, Bomber Command's heavy bombers, to conserve men and morale.⁴⁰ For Montgomery, experience in the Second World War 'proved beyond doubt that all modern military operations are in fact combined Army/Air operations'. His 1945 pamphlet *High Command in War* listed air power as the first principle of war and four of the pamphlet's forty-odd pages explained what 'any officer who aspires to hold high command in war must understand' regarding the use of air power.⁴¹

The RAF's strategic and tactical roles remained central to British defence policy after 1945 and

throughout the Cold War. After 1945 the RAF fulfilled a gamut of roles, including the nuclear deterrent; operating from, protecting and maintaining the air routes to forward operating bases around the globe; the air defence of the UK; support to maritime forces in the North Atlantic from collocated maritime and air headquarters; and in Central Region, where Headquarters British Army of the Rhine and RAF Germany and Northern Army Group and 2nd Allied Tactical Air Force were also collocated.

David Johnson's argument that the relative roles of U.S. ground and air power in war fighting have shifted since the end of the Cold War applies also to the supporting British forces.⁴² The liberation of Kuwait in 1991 was the combined result of a strategic air operation, a lengthy shaping air operation against Iraq's fielded forces, and a short, successful land operation. This saw the application of the US Army Air/Land Battle concept, a manoeuvrist combined arms approach designed to destroy a Soviet attack in the central region, and which was adopted by the British Army during the Bagnall reforms of the 1980s. In Kosovo in 1999 an air operation successfully coerced the Serbian leadership. The use of air power, special forces and indigenous forces in Afghanistan in 2001 was seen by some as a model for future warfare.⁴³ And in 2003 the majority of the joint fires used were air.

Counter-insurgency

When the US Army faced failure in Iraq in 2004-5 it looked to post-colonial counter-insurgencies for inspiration. British success in Malaya, correctly regarded as an exemplar counter-insurgency campaign, was one of the historical studies which General Petraeus and his team used for their seminal counter-insurgency field manual.⁴⁴ The principles of contemporary US, British and now NATO counter-insurgency doctrine can all be traced from General Brigg's 1950 plan to turn around the British campaign in Malaya and Robert Thompson's formulation of them: the government must have a clear political aim, function within the law, have an overall plan, give priority to defeating the political subversion not the guerrillas; and in the guerrilla phase of an insurgency, it must secure its bases first.⁴⁵ The application of what should properly be termed population-centric counter-insurgency doctrine is generally regarded as a major factor in US success in Iraq and is now proving successful in Afghanistan.⁴⁶

But air power is seen in a supporting role only, consigned to a five-page annex in the US doctrine.⁴⁷ An overreliance on air power's firepower is seen as counter-productive, reducing the legitimacy of the counter-insurgent, and means the counter-insurgent is not engaging with the population.⁴⁸ When assuming command in Afghanistan, General McChrystal warned of 'the necessity to avoid winning tactical victories while suffering strategic defeats' through the indiscriminate or disproportionate use of air power.⁴⁹ Furthermore, recent British counter-insurgency doctrine appears to write-off the role of air power through the selected use of history. However, revisionist historians are increasingly reinterpreting the British counter-insurgency expertise; the campaigns were more forceful, the approach similar to other European colonial powers than the myth allows, and more reliant on air power than the myth allows.⁵⁰

Where conditions permit, air power has provided the fighting power to make up for force-levels too small for population control; the conventional wisdom is around twenty to twenty-five counter-insurgents are required for every 1000 of the population.⁵¹ Thus General Brigg's eponymous plan ordered the RAF's six squadrons in Malaya to 'operate in conjunction with and in support of the ground forces. This support may include offensive air strikes (bombing and ground strafing attacks), air supply, visual and photographic air reconnaissance, survey photography and inter-communication.'⁵² There is no question that the mobility role, delivering 700,000 lbs of supplies a month, was vital to ground force mobility and the effectiveness of the reformed SAS. 'Pysops' broadcasts were equally effective. When questioned in 1955, every single surrendered insurgent reported hearing broadcasts from voice aircraft.⁵³ Less well known is that offensive air action caused ten per cent of the 7000 insurgent fatalities during the Emergency. This is a significant proportion given the terrain; though it was the result of 7000 strike missions and over 70 million lbs of bombs.⁵⁴ Despite the cost in materiel, the use of air power appealed to British ministers by saving conscript British soldiers' lives; the Secretary of State for War, for example, was convinced air attack 'had a genuine effect on the morale of the bandits'.⁵⁵

In an earlier age of austerity and imperial overstretch in 1920-21, Winston Churchill and his advisors, Sir Hugh Trenchard and T. E. Lawrence, convinced the cabinet to rule Iraq indirectly through an Arab king and support him with air power, as an alternative to abandoning the mandate as unaffordable.⁵⁶ This policy, called air control, followed the so-called Ten-year Rule's direction to make maximum use of 'mechanical contrivances' to police the empire economically and followed a revolt by over 60,000 insurgents armed with modern rifles, and who had overwhelmed a British battalion.⁵⁷ Scholars rightly continue to warn of learning false lessons from RAF control in Iraq, but air control allowed 'control without occupation', it reduced lines of communication and allowed 'better living conditions', and it 'not involve obtrusive presence - yet retains the threat of force'.⁵⁸ The RAF used eight squadrons of aircraft, armoured cars, locally recruited imperial levies and the nascent Iraqi army to replace two army divisions and suppress revolts by the Kurdish and marsh Arab minorities, Wahabi raids from Saudi Arabia and a Turkish attempt to regain Mosul. In the 'campaign tribalism' of the day, the War Office criticised the brutality of bombing recalcitrant villages and refused to provide the RAF with armoured cars, so it made and manned its own.⁵⁹ The RAF argued that the short-sharp pain of an air raid on an empty village was less forceful and risky than a punitive column to both sides.⁶⁰ David Omissi called air control 'technological imperialism'. Postcolonial scholars are critical of air control; Priya Satia describing it as a 'new form of imperial rule, invisible, barely existing on paper, designed for an increasingly anti-imperialist post-war world', and as much for misleading public opinion at home as maintaining internal security.⁶¹ But that was its purpose. The British continued to use air control until the early 1960s on Southern Arabia.⁶²

Though the current British Army doctrine describes the policy of air control losing 'favour during the 1930s when it was seen clearly that aircraft can only bomb and shoot once the intimidating and deterrent effect of air power had worn off',⁶³ this was the period of one of

the RAF's most vital contributions in the intriguing and little studied Arab Revolt in Palestine in 1936-39. When Churchill gave control of Palestine to the RAF in 1922 it was for administrative convenience only as the limitations of air power in urban Palestine were recognized.⁶⁴ In 1936 increased Jewish immigration, perceived British weakness in the Eastern Mediterranean and external support from Syria and Iraq led to a revolt which combined a general strike, urban terrorism, and guerrilla bands, which soon controlled large parts of the countryside. Colonel H. J. Simson, the British forces' chief of staff in Palestine, who had served during the Irish Wars, thought the rebellion a new form of warfare.⁶⁵ The RAF deployed lorries equipped with radio sets with army columns and convoys to call in aircraft on ground alert if attacked. This enabled the army and RAF armoured cars to operate in mobile, small units. After a few months, two army divisions were sent as reinforcements and Lieutenant General Dill, later Chief of the Imperial General Staff, took over from AVM Peirse. This was not air control, but joint counter-insurgency operations; Dill called it 'combined action'. Aircraft had become the main mode of engaging guerrillas.⁶⁶ According to Dill's reports:

*The value of the Air Force, when arrangements can be made for it to be at instant call, has been most marked, [...] Rebels hold the Air Force in such respect that on occasions it had the effect of driving them to cover or dispersing them before the troops could get in touch with them.*⁶⁷

*When it came to striking at the enemy in the hills it was usually upon the bombs and guns of his aircraft that the commander would rely for a concentration of force at the decisive point. The fact that in some months more than 50% of enemy casualties resulted from air action bears witness to their effect.*⁶⁸

The Palestine campaign challenges the conventional wisdom of poor inter-service co-operation between the wars and of the utility of air power in counter-insurgency. Arthur Harris, the Air Officer Commanding in 1938-39, cannot resist opening his autobiography *Bomber Offensive* by telling of his 'busy year teaching the British Army the advantages and the rebels the effectiveness of air power'.⁶⁹ Harris goes on to attribute Montgomery's respect for air power from his time commanding a division in Palestine. Harris thought the most effective aircraft was the front-line four-gun Gladiator fighter, and not the vulnerable and poorly armed obsolete army co-operation aircraft. When the Arab guerrillas switched to night operations to avoid the aircraft, Orde Wingate formed special night squads of British soldiers and Haganah auxiliaries to exploit Jewish intelligence. Harris thought Wingate's small squads and supported by air power would be the ideal combination – except his aircraft struggled to operate at night.⁷⁰ Although there is evidence of British brutality towards Arabs, none of the criticism is directed at the RAF, which appears to have acted within restrictive rules of engagement designed not to antagonise friendly, neighbouring Arab states.⁷¹ In the very different circumstances of the urban Jewish insurgency in Palestine in 1948 air power was hardly used.

A more recent example of air power in counter-insurgency is in the Dhofar War. Though the

current counter-insurgency doctrine cites 'the British Army's counter-insurgency campaign' in the Dhofar as 'one of the most successful counter-insurgency campaigns of the twentieth century' it was, of course, fought by the Sultan's Armed Forces, who were led by British seconded and contracted officers. Though the doctrine also brings out the importance of drawing insurgents onto the Sultan's side and of civil-military co-ordination, little mention is made of air power. One of those seconded officers was a young Strikemaster pilot called Jock Stirrup. As the Chief of the Defence Staff, his introduction to the UK's joint stabilisation includes the only use of the phrase air power is used in the 245-page document. Stirrup is careful to make the point that, whereas the general lessons of political primacy, long-term commitment and the necessary use of force are enduring, the tactical lessons were derived from the circumstances. These were the 'use of special forces on influence operations; the crucial role of helicopters in providing tactical mobility and logistic support in difficult terrain; the ability of responsive air power to multiply many times the force available to light, mobile units, and the consequent need for close air-land integration.'⁷² Ian Gardiner's account of his service in the Dhofar tells a similar story and starts with a helicopter casevac.⁷³

Notwithstanding the success of the allied operations in Afghanistan since 2009, allied forces there are dependent on allied air power. Generals McChrystal and Petraeus are right of course, that killing civilians through the use of too much firepower is counter-productive; it is also wrong. But the reality is that allied forces have been too small for population centric counter-insurgency, and have therefore been dependent on firepower. The para major's famous misogynist complaint was that the RAF was useless, not unnecessary:

*The RAF have been utterly, utterly useless. Twice I have had Harriers in support when c/s on the ground have been in heavy contact. [...] A female Harrier pilot 'couldn't identify the target', fired two phosphorous rockets that just missed our own compound.'*⁷⁴

Currently in Afghanistan only around fifty per cent of the requests for close air support are filled, and the proportions for surveillance and electronic warfare are similar. There is a shortage, not surplus, of allied aircraft in Afghanistan.

Unitary War

The myth of the limited utility of air power in counter-insurgency is compounded by the argument that, as General James N. Mattis told the US Congress in March 2009, 'Simply put, much of what we see in the cities of Iraq, the mountains of Afghanistan, and the foothills of southern Lebanon, I believe we will see again in the future.'⁷⁵ Stirrup's replacement as Chief of the Defence Staff, General Sir David Richards, told one magazine: 'Afghanistan is a signpost for the future.'⁷⁶ But one academic reviewer of Petraeus seminal counter-insurgency doctrine thought the manual an example of 'campaign tribalism' and a challenge to the conventional 'American Way of War' was the 'opening salvo in a fight for the internal culture of the traditional, kinetic, force-on-force' US Army.⁷⁷ The UK's stabilisation doctrine goes further. It conflates the

impact of globalisation in increasing instability and numbers of failing states, the increasing need for a British military contribution to stabilisation operations, and the 'evolving character of conflict' of blurring state and non-state actors, who present so-called hybrid threats, and exploit the limitations of the (information-age) revolution in military affairs.⁷⁸ General Richards makes a very similar argument cogently in his *Victory Among People: Lessons from Countering Insurgency and Stabilising Fragile States*, referring frequently to the DCDC's *Global Strategic Trends Out to 2040* study.⁷⁹ Richards explains the resulting campaigns 'are almost unavoidably operations among the population. De facto, these are wars for the population, and they are complicated because those who threaten society live, hide and operate within it'. Hence understanding the population is key, not just being able to locate, identify and track a conventional enemy's tanks and aircraft. Success is measured by the population's security, not the destruction of the enemy's combat power. The requirement is therefore more 'boots on the ground' to get amongst the people.

In wars among the people, when counter-insurgents resort to using a lot of firepower – often delivered from the air in extremis as a result of insufficient manpower – they are almost certainly losing. It is important, therefore, to have enough troops to retain the tactical initiative and to provide the enduring routine security without which, as I have emphasised, the population will not have the confidence to reject the insurgent or spoiler.

The implications of the prevalence stabilisation operations on force structures and capabilities were made clear. For General Sir Richard Dannatt, as Chief of the General Staff, these changes meant that Britain was at a strategic cross-roads, and the SDSR gave the opportunity to invest in the army and those 'elements' of the RN and RAF necessary to support these new wars - support helicopters, surveillance platforms, and strategic lift.⁸⁰ General Richards has frequently referred to 'our generation's horse and tank moment' requiring similar transformation to the British Army between the wars.⁸¹ This is an interesting simile given that after the combined arms victory of 1918 the army went back to what General Milne, an inter-war Chief of the Imperial General Staff, famously called 'real soldiering', with horse cavalry rather than tanks.⁸² The degree to which the army's lack of change then was internal resistance or imposed on it, because of the need for parsimony in the absence of an European threat, or cavalry was better for imperial policing, is still the subject of debate.

Max Hastings thought 'almost any likely British commitment abroad, for war-fighting or peacekeeping, will require boots on the ground. If the Defence Review pretends otherwise, it is unlikely to command respect'. In *The Guardian* he wrote:

Radical change is needed in the chiefs-of-staff organisation. The nonsense of assuming parity between the three services must stop. The army's role is today overwhelmingly paramount. The other services perform important support functions, but they are not fighting forces in the same way [...] A soldier should always hold Stirrup's job. Admirals and air marshals, today bureaucrats in uniform rather than warriors, lack the perspective, knowledge and experience

*credibly to preside over the armed forces. We shall not again have to fight either the Battle of the Atlantic or the Battle of Britain. Anti-submarine warfare platforms and high-level interceptors are almost redundant. They represent negligible priorities, alongside the army's need for infantrymen, helicopters and armoured vehicles to fight real wars in real places.*⁸³

In *The Spectator* he argued the RAF should be reintegrated with the army. Having an airman as chief of defence staff was a charade, and meant he appointed other airman to key operational appointments: a navigator as chief of joint operations and another airman as senior British military advisor at CENTOM.⁸⁴

Hew Strachan, the Oxford historian, thought the existing joint models of operational command, doctrine and training were now dangerously outdated given the unitary, land-centric character of future conflict. In his view, increasingly, the armed forces should prepare for a unitary view of war which is land-centric. He saw 'airpower in terms of attack helicopters, air mobility and strategic lift, not fast jets'. Strachan argued that the institutions of joint warfare – joint doctrine, a joint staff course, and a permanent joint headquarters merely detracted from land-centric future war and therefore Britain's conduct of war.⁸⁵

But this burgeoning argument that stabilisation or counter-insurgency represents the future of conflict is flawed. It is true internal 'wars amongst the people' has been and is increasingly the most prevalent and deadly form of war, and counter-insurgency has been the most common form of warfare for British forces during the retreat from empire and in the aftermath of the invasions of Afghanistan and Iraq.⁸⁶ The warfare that 'seemed peripheral has become central' but it has not become the only form of war.⁸⁷ The MOD's *Global Strategic Trends* and its sister *Future Character of Conflict* study look beyond stabilisation. Both warn that the convergence of a number of strategic trends - globalisation, climate change, and increasing population, and a shift to multi-popularity – in addition to failing states, may lead to increasing inter-state competition for limited resources and access to the global commons and require other forms of armed intervention.⁸⁸ In the past people have formed states to fight for resources: as Charles Tilly wrote 'war makes the state and the state makes war'.⁸⁹ Furthermore, WMD proliferation increases the potential for inter-state tension. The stabilisation argument also assumes Britain will always intervene on the side of a legitimate government whereas in Responsibility to Protect-type humanitarian interventions it may intervene in order to protect the population from the government.

The presupposition of the highly trained, well equipped semi-regular Hezbollah hybrid threat of popular myth as a harbinger of future conflict has been questioned. William F. Owen has argued the 2006 conflict requires no new language or new concepts of conflict as it has all been seen before and assuming all future operations will be counter-insurgencies or asymmetric is a failure of thought. Instead Owens thought the conflict should be seen as a warning of 'ignoring what should be well known and understood'.⁹⁰ Others, including the official Israeli government inquiry, thought Israel's performance was a result as much of its own

shortfalls as Hezbollah's abilities. It is clear that Israel's unrealistic expectations for systemic effects-based operations implemented by air power contributed greatly to its operational and tactical problems. Furthermore, a focus on internal security operations in the occupied territories meant the Israeli Army was tactically unprepared and untrained to fight against a determined Hezbollah force conducting a conventional, fixed-position defence.⁹¹ Israeli air power was not a 'silver bullet', but it was the most flexible tool for fighting Hezbollah; a land-led campaign might well have led to much higher losses and an even more negative press, and may not have had Israeli public support, initially. The Israeli Defence Forces succeeded in that there has been relative peace between Israel and Hezbollah since 2006 but failed to win the 'battle of the narratives'.⁹²

The Kosovo operation is an example of successful coercion by air power; various studies have shown that despite the political limitations on targeting and collateral damage, air power did surprisingly well in the conflict.⁹³ A recent quantitative study has shown that air strikes increased the cost of continued defiance to Milosevic and his supporters, while demonstrating NATO's resolve.⁹⁴ Air power was viewed as the next acceptable step after diplomatic and economic measures and was chosen because it had worked in Bosnia and Iraq, could be deployed quickly, and minimized the risk of Allied and civilian casualties.⁹⁵ Initial efforts were hampered by poor co-ordination and a limited number of approved target sets, and the 214 US aircraft and 130 from other NATO Allies flew only around 100 sorties a day. After a month the target set was widened and the number of sorties flew increased to around 500 per day. The role land forces played in Milosevic's decision to concede is hotly debated; General Wesley Clark, as SACEUR, thought it important, whereas a Lambeth's Rand study found no evidence for it.⁹⁶ Wes Clark's deputy, General Sir Rupert Smith is quite clear about the success of air power in Kosovo in the UK stabilisation doctrine: 'Serbian targets in both Kosovo and the rest of Serbia were bombed to the point that the Serbian forces withdrew from Kosovo and NATO forces entered the province. The objective of the bombing was achieved'.⁹⁷ Smith then explains the need to plan for the subsequent occupation. Despite the relative success of the Kosovo operation, Tony Blair's Chicago speech laying out the doctrine for humanitarian intervention made during the operation is referred to in the past tense in the *Future Character of Conflict*, a zeitgeist of a previous age.⁹⁸

Conclusion

The intervention in Libya is another reminder of the utility of air power in limited war and its attractiveness to liberal democracies. *The End of History and the Last Man* has been interpreted as a neoconservative tract, calling for the use of force to impose democracy, and the use of air power has been linked with this discredited approach. This may have been why David Cameron's spokesman told the Economist during a visit to Cairo in February 2011 that the prime minister was not a 'naive neoconservative' who thought that democracy could be dropped from a bomb bay at 40,000 feet.⁹⁹ But on 19 March RAF Tornado GR4 (and HMS Triumph's Tomahawk missiles), authorised by the UN Security Council Resolution 1973,

participated in a co-ordinated strike against Libyan Air Defence systems because the UK believed 'we should not stand aside while this dictator murders his own people'.¹⁰⁰ The intervention in Libya complies with the five considerations outlined by Tony Blair in his Chicago speech in 1999.

The RAF is currently flying around twenty-five per cent of all sorties over Libya. The unwillingness of the US to take a leading role in the operation has obviously caused difficulties. At the time of writing the outcome is uncertain and may result in a stalemate given the limitations of an air only intervention and the restrictions of the UN mandate. However there is an element of *Schadenfreude* in the newspaper accounts of requests for more unmanned air vehicles from the USA, US maritime patrol aircraft protecting HM ships, and the Chief of the Defence Staff calling for NATO to attack Libyan infrastructure to coerce Ghaddafi's regime.¹⁰¹

To assume all future conflict is land-centric and therefore the utility of air power is limited is flawed for a number of reasons. First, air power often plays a vital role in counter-insurgency. Where circumstances allow, all the roles of air power are a force multiplier, particularly for Western forces too small to secure the population. Furthermore it is our conventional strength, and in particular air power, which forces the insurgent to fight as a guerrilla or terrorist. Second, British military intervention will not always be as a counter-insurgent, supporting a threatened government which has some claim to legitimacy. In Libya, as in Kosovo previously, Britain and its allies have intervened to prevent civilian casualties, in doing so indirectly supporting an insurgency. Third, global trends in demography and climate change, competition for limited resources and geopolitics mean does not mean that for Britain all future conflicts will result in counter-insurgency operations.

In the evolving character of conflict argument in Britain much has been made of Clausewitz's characterisations of the nature and character of war. According to the MOD's *Future Character of Conflict* study, to forget war's unchanging character will lead to hubris, as with the belief that the information-age revolution in military affairs could redefine war. But the use of air power in Libya is a reminder of Clausewitz's dictum that war is a continuation of politics. Moreover, Clausewitz realised different societies through the ages have waged wars in their own way: 'differently, with different means and with different purposes and the aims a belligerent adopts, and the resources he employs, must be governed by the particular features of his own situation'.¹⁰² Successive British governments favoured air power because they and the public saw it as a unique threat to Britain from its inception to the end of the Cold War. Furthermore, Montgomery listed air power as his first principle of war because it saved British lives on the battlefield, and this remains a truism for operations in Afghanistan today.

The fourth reason that air power continues to have utility is that the liberal democracies wish to avoid bloody land conflict. Before World War Two air power offered Britain an alternative to a continental commitment. After the 'end of history', in Fukuyama's post-Cold War world, it offers what Edward Luttwak has called a 'post-heroic way of war'.¹⁰³ In Clausewitz's trilogy of people,

state and armed forces, it allows public support for the use of force, using technology to avoid casualties. Furthermore, in the particular circumstances of Libya, it has allowed intervention in support of democracy without the occupation unacceptable both to the British polity and the international community.¹⁰⁴ This does not mean all future conflict will look like Libya, but nor will it look like Afghanistan.

In their attempts to construct universalisms for history and war respectively, both Clausewitz and Hegel used a dialectic approach; that is their writings took the form of a debate, recording synthesis, antithesis and synthesis. By noting both sides of the argument, they are particularly prone to selective quotation. Thus, Hegel's observation 'that peoples and governments never have learned anything from history, or acted on principles deduced from it' reads as a criticism of a failure to learn, until one reads the next line which is a defence of the particular in the search for universal truths: 'Each period is involved in such peculiar circumstances, exhibits a condition of things so strictly idiosyncratic, that its conduct must be regulated by considerations connect with itself and itself alone.'¹⁰⁵

Notes

¹ Francis Fukuyama, 'The End of History', *The National Interest*, 1989; later elaborated in Francis Fukuyama, *The End of History and the Last Man*. (London: Hamish Hamilton, 1992); Shashank Joshi, 'Reflections in the Arab Revolutions: Order, Democracy and Western Policy', *The RUSI Journal*, 156 (2011), 60-66.

² Samuel Huntington, 'The Clash of Civilizations', *Foreign Affairs*, 72 (1993), pp. 22-49.

³ For a recent summary of the academic literature see Beatrice Heuser, *The Evolution of Strategy: Thinking War from Antiquity to the Present* (Cambridge: Cambridge University Press, 2010).

⁴ *A Strong Britain in an Age of Uncertainty National Security Strategy*, Cm 7953 (London: TSO, 2010), p. 5; *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948 (London: TSO, 2010), p. 4. Hereafter SDSR.

⁵ General Sir Nicholas Houghton, 'Vice Defence Chief Speech at CSIS', 1 November 2010 <<http://ukinusa.fco.gov.uk/en/news/?view=Speech&id=23123245>> [accessed 14 May 2011].

⁶ SDSR, p. 20.

⁷ *Statement on Defence 1952*, (London, HMSO: 1952); 'Defence Analytical Services and Advice: UKDS Factsheet' <<http://www.dasa.mod.uk/applications/newWeb/www/index.php?page=67&pubType=1&thiscontent=1600&date=2011-05-08>> [accessed 8 May 2011]; *Securing Britain*, p. 32.

⁸ Paul Cornish, 'UK Defence: A Test Case', *The World Today*, 67 (2011), 4-6.

⁹ Anthony King, 'Military Command in the Last Decade', *International Affairs*, 87 (2011): 394.

¹⁰ Paul Cornish and Andrew Dorman, 'National Defence in the Age of Austerity', *International Affairs*, 85 (2009): 738.

¹¹ Timothy Edmunds, 'The Defence Dilemma in Britain', *International Affairs*, 86 (2010), 377-394.

¹² King, pp. 389-390.

¹³ Houghton, Speech at CSIS.

¹⁴ Beatrice Heuser, *Reading Clausewitz* (London: Pimlico, 2001).

¹⁵ *Future Character of Conflict*, p. 5, p. 7.

¹⁶ R. J. Overy, *The Air War 1939-1945* (London: Papermac, 1987); see also Michael Howard, *The Continental Commitment: The Dilemma of British Defence Policy in the Era of the Two World Wars* (Harmondsworth: Penguin, 1974). For the Cold War continental commitment debate see Hew Strachan, 'The British Way in Warfare Revisited', *The Historical Journal*, 26 (1983), 447-461.

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Book Reviews

The Age of Air Power

By Martin Van Creveld

Reviewed by Group Captain Clive Blount

Introduction

The name Martin Van Creveld on the cover of a new book guarantees wide public interest, a meticulously researched product and, most likely, an element of controversial thinking, *The Age of Air Power* does not disappoint. One is normally wary of wide ranging general histories as they often lack depth and usually miss out minor, but important periods, in the development of the use of air power – or make little effort to detail the context against which that use may be analysed. This is most definitely not the case in this work, Van Creveld has produced a comprehensive, thoughtful and wide-ranging work in which, it is probably fair to say, that no recorded use of aircraft in war has been excluded, ranging from the Italo-Turkish war of 1911/2 through to the insurgency in El Salvador during the early 1990s. The compression required to achieve this fascinating ‘one stop shop’ of air power history has resulted in a somewhat dense and challenging read, but it is a read that rewards perseverance.

The book is divided into five main sections followed by a conclusion. The first section, entitled *Into the Blue*, covers the period 1900 – 1939 and describes the development of air power from the early days of the Wright brothers, through its coming of age in the first world war, and then discusses the developments of early air power thinking and the emergence of ‘air forces’. The second section is devoted to the Second World War, which Van Creveld sees as the zenith of air power’s development... and utility. Sections three and four cover the ‘cold war’ period, 1945-1991, and the use of air power in the numerous ‘small wars’ during that time; he devotes section

five to 'wars among the people'.

Martin Van Creveld is an internationally recognized authority on military history and strategy, and it is this pedigree that comes to the fore as the book progresses. Strategic context and analysis is incisive and compelling – although his almost total reliance on secondary sources is a little disappointing. It rapidly becomes obvious, however, that Van Creveld is not an Air Power specialist. Many of his assertions demonstrate a lack of knowledge of the technical background to air operations. For instance, he describes that US F4s and F111s were ineffective in Vietnam because they were difficult to manoeuvre when they had to *slow down* to deliver their bombs (!) and describes the NVAF MiGs as having a huge advantage over USAF attacker during Rolling Thunder because they had 'lots of guns'. . . he fails to produce any evidence to support this assumption – which accepted wisdom suggests is just some what off the mark. Sadly, I often found myself frustrated that he was 'missing the point' – often a good point – in the same way that one is frustrated at so-called 'military aware' pundits in the media.

This failing in the 'tactical' details of the book means that, by the time one reaches the conclusion, the impact of the somewhat 'anti-air power' polemic is lost and I found myself just impatient with the author. In essence, Van Creveld's thesis is that, despite its remarkable dominance as an instrument of war throughout the second half of the twentieth century, air power is now, effectively, obsolete, despite the billions of dollars it costs. For instance, he suggests that the claims made about modern technology raising the effectiveness and utility of modern air power are merely myths - he cites the fact that, despite the so-called "Revolution in Military Affairs", US ground troops calling for air support in Iraq in 2003 did not receive it any faster than Allied forces did in Tunisia in 1943 or in France in 1944-45. (It is a shame that he did not mention the massive follow-up when this fact became apparent which has led to the excellent degree of Air-Land integration being enjoyed in Afghanistan today). In other arguments against air power he suggests that, if air power is so important, why is it that the number of military aircraft being procured around the world each year has fallen from over 200,000 in 1944 to a few hundred today? And also, why shouldn't air power be 'penny-packeted' out to the users rather than centrally controlled by an independent service? I am fairly sure that any regular reader of APR could make a fair argument to answer this question quite readily! The author concentrates primarily on the kinetic use of air power and does fully discuss the wider roles of air power, particularly in enabling mobility and supporting the ISR effort, and hasn't fully analysed the effects of emerging technologies such as UASs and DEW. One feels that he has deployed facts selectively to court controversy in an attempt to demonstrate that air forces are an institutional relic and that air power has passed its 'high-water' mark as a military implement and is in decline. What is probably a more supportable argument is that the utility of 'hard' military power, of which air power is just one part, is in decline and that a number of Van Creveld's arguments could be applied equally to maritime or land forces.

As a historical *tour d'horizon* of air power this book is probably without equal. It is a shame that factual misinterpretation and poorly supported arguments undermine the analysis. That

said, as profession air power practitioners, we should maintain an open mind to alternative ideas and be willing to engage in lively debate in order to keep what we do relevant – and to develop. With that in mind, and noting the limitations discussed above, this book is certainly worth a read.

Book Reviews

Lawrence of Arabia's Secret Air Force: Based on the Diary of Flight Sergeant George Hynes

By James Patrick Hynes

Reviewed by Group Captain John Alexander

Introduction

Pare away the myth and enigma of T.E. Lawrence and one finds a proponent of air power. Air power, orchestrated by Lawrence, provided critical support to the Arab Revolt, 1916-1918, as his *Seven Pillars of Wisdom* notes in several passages, including this:

*The co-operation of the air with his [General Allenby's] unfolding scheme had been so ready and elastic, the liaison so complete and informed and quick. It was the RAF which had converted the Turkish retreat into rout, which had abolished their telephone and telegraph connections, had blocked their lorry columns, scattered their infantry units.*¹

Lawrence of Arabia's Secret Air Force increases our understanding of the role of air power in the Arab Revolt by recounting the memoirs of a technician, George Hynes, who served in the flight of 14 Squadron attached to the Arab Army.

Hynes, a 19-year old maritime engineer, joined the RFC in 1914, and 14 Squadron when it formed in February 1915, sailing with it to Egypt in November. He deployed with Major Ross's C Flight to the Hejaz, some 700 miles east of the Squadron's base in Egypt, in November 1916 to support the nascent Revolt. Whereas Sharif Hussein did not want Christian troops close to Mecca he felt able to allow the Flight's six aircraft, air and ground crews, and Egyptian infantry force protection. X Flight was subsequently formed from C Flight after the capture of Aqaba in July 1917, under Captain Stent's command.²

Hynes was responsible for keeping the flights' mix of aircraft airworthy on isolated landing grounds in extreme weather conditions. The Germans and Turks had numerous and often better aircraft but according to Hynes they could not match the British serviceability rate. Though the Flight lost only one machine and that to enemy action, Hynes often had to recover aircraft. On one occasion he drove into the Sinai desert to find and repair a downed aircraft carrying Lawrence. The Arab Army's advance into Syria and the short range of the aircraft meant continual moves of landing ground, culminating in supporting Allenby's great victory at Megiddo in September 1918, prior to the occupation of Damascus and the Turkish surrender in October. X Flight was soon disbanded but not before Lawrence gave the men a guided tour of Aqaba's antiquities.

The book is a fascinating and very readable account, although the editing, by Hynes's nephew, is a curate's egg. The preface and introduction provide good context of both Hynes's service and the Arab Revolt, but elsewhere the editor's additions from other references (such as the Flight's War Diaries) sometimes confuse. For example, when describing events of late 1916, the editor inserts a *Seven Pillars* passage, albeit another excellent example of air land integration, from August 1917:

We could also prick the Turks into discomfort by asking General Salmond for his promised long distance air-raid on Maan. As it was difficult Salmond had chosen Stent, with other tried pilots of Rabegh or Wejh [X Flight], and told them to do their best. They had experience of forced landing on desert surfaces and could pick out an unknown destination across unmapped hills: Stent spoke Arabic perfectly. The flight had to be air-contained, but its commander was full of resource and display.³

Thus, Hynes's descriptions resonate with current operations. The flight commanders, Ross and Stent, were both Arabic-speaking and independently-minded, presumably specially selected, reflecting the mission's importance. Furthermore the flights' cohesive 'desert spirit', enhanced by Lawrence's leadership and witnessed by him, is frequently referred to; such as when Lord Winterton (later a cabinet minister) cooks Lawrence and some riggers a rare breakfast of bacon. And despite the harsh conditions – poor rations, accommodation and no air-conditioning – at Christmas 1917 each man got fresh potatoes and a bottle of beer flown in from Egypt by the flight commander.

As Group Captain Blount's recent article in this journal highlighted, T. E. Lawrence, though now a fashionable totem for population-centric counter-insurgency, also has much for the modern airman.⁴ Like any memoirs written long after the event these should be read with caution – Hynes wrote his in the 1960s in response to Richard Aldington's 1955 biography which portrayed Lawrence as a boastful charlatan.⁵ Nevertheless *Lawrence's Secret Air Force* is further evidence of Lawrence's advocacy of air power and its employment in the Revolt, so evident in *Seven Pillars* but less so some recent work.⁶ Furthermore Hynes's account describes Lawrence's seminal experience of the RAF. Was it this experience which caused him to decide

in 1918 that he would enlist in the RAF, after 'settling the Arab affair',⁷ and to use the name Ross when he did so?

Notes

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Book Reviews

Joint Doctrine Note 2/11: The UK Approach to Unmanned Aircraft Systems

Reviewed by Group Captain (Ret'd) Ian Shields

Introduction

A Joint Doctrine Note (JDN) addresses areas, usually of rapid development, that require something approaching definitive doctrine, but to ensure timeliness are not subject to the same degree of rigorous staffing that formally-endorsed doctrine undergoes. They are raised by the Development, Concepts and Doctrine Centre and seek to capture best practice that can subsequently be captured in formal doctrine, or to place doctrinal markers in the sand, around which subsequent debate can centre. It is not usual for the book review pages of *Airpower Review* to consider internal MOD publications, but such is the importance of unmanned systems for the future conduct of air operations that this publication requires review, both for its content and to raise its profile. The manned/unmanned debate rages, and if we are to conduct it in a sensible and informed manner, and not fall into the trap that Duncan Sandy's 1957 Defence Review (arguing the end of manned aircraft in favour of the missile, with disastrous effects for both the British aircraft industry and the RAF) then contributions such as this JDN deserve very close study.

That said, readers of *Airpower Review* will be well aware of the rapid advances in the technology enabling, and the employment of, Unmanned Aircraft Systems (UAS) and will also, no doubt, recognise that there is little in the way of reference to UAS in British, or indeed other, doctrine; this JDN seeks to redress that shortfall. But to what extent does it succeed?

Before addressing that question, a word about words. There is presently a debate on whether

the expression “Unmanned Aircraft Systems” or “Remotely Piloted Vehicles” (RPV) best describes these vehicles/systems. It is not the place of this review to join the debate, the letters pages of *Airpower Review* are the correct place for such a discussion (which would be both welcome and healthy); since the JDN uses the expression “UAS” this review will follow the same regime.

JDN 2/11 comprises 7 well-written and well-paced chapters. In the first half of the document it summarises the present UK position by considering issues such as current terminology and classification (of types – primarily by weight in line with CAA practice), explores the present UK inventory (the advantage of a JDN over formal doctrine: it has a limited shelf-life and can therefore introduce matter that can be expected to date rapidly with no detriment to the publication) and, in Chapter 3, sets out very clearly the advantages and disadvantages of unmanned systems. While much of the first half of the document is stating of facts and setting the scene (necessary given the lack of formal writing on the issue), Chapter 3 is also an excellent summary of the manned versus unmanned debate; this Chapter captures well that debate and allows the reader to draw his/her own conclusions by avoiding both the temptation to prescribe an answer and the pitfall of dismissing either side of the argument. This very useful description of the debate is one of two aspects of the first half of JDN 2/11 that struck me as being particularly strong, the other being the excellent piece in Chapter 4 on the Maritime requirement. This not only underlines the joint credentials of this document, but reinforces that UAS have applications beyond supporting the Land environment. However, while I commend this aspect, I would at this point also introduce two criticisms of the first half of the JDN: I would have liked to have seen a more robust and transparent discussion of UAS in the pure Air role: the discussion is there (on tankers and ISTAR platforms for example) but sections devoted respectively to the Land, Maritime and Air environments would have increased the clarity of this (generally very clear) publication. My second criticism of the first half of the booklet is the ordering of the chapters: this may be a personal preference but I believe that Chapter 3 would have been better coming before Chapter 2.

By considering some present UK industry initiatives, Chapter 4 points towards the future, and it is the future that the second half of the JDN considers in Chapters 5 – 7. Here the DCDC shows one of its great strengths: based on sound logic and a clear comprehension of how present trends might play out, this note looks well into the future, both asking difficult questions - and offering fascinating glimpses on how the future battlespace might look and the contribution that UAS might make to peer through the fog of war. This second half opens with what is, in many ways, the most contentious and provocative section: Chapter 5 on Moral, Legal and Ethical Issues; it is also, I believe, alongside the debate on manned versus unmanned, one of two most important sections in the publication. It does not shirk from highlighting difficult issues and deserves thorough and deep reading; it has already been commented on by, among others, the Guardian newspaper (<http://www.guardian.co.uk/world/2011/apr/17/terminators-drone-strikes-mod-ethics>). That the DCDC retains a Tri-Service legal team was clearly of great benefit when writing this chapter and their undoubted contribution has enriched an already challenging section. This debate on ethics is followed (again, I am not sure that the chapters

are in the best order) by a well-researched section on Science and Technology before the JDN looks firmly into the future with Chapter 7: The Future Battlespace. This latter chapter draws heavily on the DCDC's well-received work on the Future Character of Conflict (or FCOC – see: <http://www.mod.uk/DefenceInternet/MicroSite/DCDC/OurPublications/Concepts/FutureCharacterOfConflict.htm>) but brings the whole debate to life with two well-judged vignettes. Following a brief Conclusion, the JDN concludes with three supporting Annexes and a useful lexicon.

To answer my earlier question: the DCDC's JDN 2/11 has filled a significant void by drawing together all of the main issues surrounding UAS, from the very expression UAS (as opposed to RPV), through the manned versus unmanned debate, to the highly pertinent but often disregarded questions on ethical, moral and legal issues. It is excellent in all these areas, and it to be commended also for highlighting the potential importance of UAS in the Maritime domain. Furthermore, in opening the debate around UAS now, this JDN offers early insights into how the next editions of AP3000 (British Air and Space Power Doctrine) and the Future Air and Space Operational Concept might develop. The publication is not without its weaknesses: I am not convinced that the authors have the optimum order for the chapters, for example. But this publication goes a very, very long way to address the shortfall in doctrine – and, indeed, wider thinking – on UAS: it is highly recommended for anyone interested in what is likely to be a mainstay of Air (and even sub-Space) Power in the future.

Book Reviews

The Art of Action: How Leaders Close the Gaps Between Plans, Actions and Results

By Stephen Bungay

Reviewed by Air Commodore Neville Parton

Introduction

Anyone who regularly scans the list of new publications in the business management area will have realised that this is an area where fads are rife, and the cynic would say that one of the main aims in this particular publishing domain is simply to find new ways of presenting old truths in a way that makes them attractive – and so of course sells. Over the last decade or so there has also been a steadily growing trend in a two-way traffic: the selling of business approaches to the military, and the selling of certain aspects of the military to business. It would be very easy to simply look at the title of *The Art of Action*, read the dust-jacket description and assume that this was another in that genre – however, that would be a mistake. Stephen Bungay's name is one that should be familiar to Air Power Review readers, as the author of the Battle of Britain tour de force *The Most Dangerous Enemy*, and the follow-on *Alamein*, and this book contains exactly the same qualities of great scholarship, detailed analysis, rigorous logic and insightful conclusions that have marked out his previous work.^{1,2} Bungay himself has an extremely broad background; initially as an academic, but then a business consultant, business director, military historian and lecturer.

So much for the writer – what about the book itself? Fundamentally it offers an analysis of a range of common problems within the business world, and then suggests a particular approach to dealing with them, however, Bungay's unusual background gives him a unique perspective which in turn provides the reader with a closely-linked set of historical examples,

detailed analysis and contemporary examples from the business world. Much of what is said is not hugely original, as the author states himself. After all, the concepts are built largely on a construct developed within the Prussian and then German armies over a 150 year period – but the way in which it is explained, and made relevant to the world that we now live in, is remarkable. The author's clear mastery of the differing worlds that he refers to is evident throughout, and the way in which significant tenets are extracted from history and then applied to the world of business strategy and delivery make it a genuinely compelling read.

The key insight is the drawing of a very clear analogy between the business of war, and the business of, well, business, and thus drawing out that the most important factor in both are those aspects which make up what Clausewitz referred to as friction. This begins with an examination of what Bungay sees as the problem, which are the difficulties that many organisations seem to have in actually getting anything done. He also identifies considerable similarities between the military environment and business, and looks at issues with a range of previous approaches from scientific management through to strategic planning before considering what the cause of the problem is – which is identified as the concept of 'friction', first introduced into the human domain by Clausewitz in the 1700s.³ Bungay identifies from this the idea of three particular gaps: the knowledge gap (which is the difference between what we would like to know and what we actually know), the alignment gap (the difference between what we want people to do and what they actually do) and finally the effects gap (the difference between what we expect our actions to achieve and what they actually do). The impact of these gaps is typically seen in organisations as more and more centralised control, greater use of detailed metrics and eventually paralysis by indecision.

Having identified the problem and cause by considering the environment of war, elements of a solution are found from the same source, this time by considering the approach of Helmuth von Moltke who identified the solution as being able to give a high degree of autonomy to individuals but at the same time also to get high alignment between their actions, resulting in what we now know as mission command. This approach deals with the three gap problem by closing each in turn: addressing the knowledge gap by limiting the direction given to defining and expressing only the essential intent, doing the same for the alignment gap by allowing each level to define what it has to do to achieve that intent, and finally for the effects gap by giving individuals the freedom to adjust their actions to deliver that intent. The overall approach is termed as 'business opportunism' by Bungay, who sees it as a theory that is very different from the scientific and engineering approaches that have been prevalent in management literature in recent years.

Particular consideration is given to the role of strategy, which is seen as fundamentally important as providing the 'aim' towards which the main effort will be deployed and against which all levels of a business can measure whether they are contributing or not. The importance of briefing and back-briefing is stressed, using a number of examples to illustrate that individuals at all levels will find themselves in situations where they have to

exercise independent thinking, for which they need to be prepared with information to enable

them to make decisions. Although Bungay does not use the term, the concept of the 'strategic corporal' is quite clearly in his mind here, and the concept of starting with a statement of intent which boils down the strategy to its fundamentals, and then briefing this down at each level to cover the higher intent two levels up, the tasks that this means for the organisation concerned and the main effort and freedoms and constraints will be familiar to most military readers. However, there are other enablers of course, and the need to train, develop and support people so that they feel 'empowered' to use their initiative, and in particular are encouraged to make decisions but not blamed if they get it wrong, is stressed. A cautionary note is also sounded with regard to the area of organisational processes such as budgeting and performance management, which can stifle any use of initiative, and of the dangers of metrics and scorecards, where achievement of the elements rather than the end becomes key.

The concept of 'commanding', and its importance is also explored, and a number of recent examples drawn from the author's recent experiences are used to illustrate the results obtained from applying this approach in the real world. The fact that commanders tend to use simple orders to guide actions is noted, with Napoleon's 'march towards the sound of the guns' given as a case in point, and the main tenets of the book are summed up in what Bungay terms GBOs (Glimpse of the Blindingly Obvious). There are ten of these, which are not repeated here - to get them you will need to read the book!

At a practical level, this can be read in a linear fashion, and every chapter usefully has a summary of the key points to aid understanding – but it can equally well be dipped into after reading the introduction to identify specific points that may be relevant to a particular issue. It is not written for the academic (although there is enough signposting of sources and evidence to satisfy those who might wish to look further) it is fundamentally written for those who are involved with the practice of leading organisations. Furthermore, the overall approach is most definitely stimulating to the mind, as it not only has a great deal to say about the way in which most large enterprises could be better led, but at the same time provides a good introduction to the military history that resulted in the doctrine that we now best know as mission command.

This is, at its heart, a book about the use of mission command in everyday life – but especially for those who are in a position of leadership and trying to effect change. Those who have been exposed to mission command, either theoretically or practically, may consider that they already know enough about the subject to employ it to good effect, and certainly do not need to be told how to apply it by a management consultant. But Bungay is much more than that, and so is his book. It offers genuine insights into the application of mission command in the day-to-day business of life, and does so in a manner that makes the reader think 'could I do that?' Who should read this book? Anyone, I would suggest, who has come up against

the very real problem of having to deliver and experiencing the gaps that are so logically identified. This is not a book which promises that if followed it will turn your life and career around, but it does provide a huge amount to think about, and packaged in a manner which is inherently understandable to those in the military – go read it!

Notes

¹ Bungay, S. (2000). *The Most Dangerous Enemy*. London, Aurum Press Ltd.

² Bungay, S. (2002). *Alamein*. London, Aurum Press Ltd.

³ Clausewitz, C. v., M. Howard, et al. (2007). *On war*. Oxford, Oxford University Press.

Notes

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